BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

In the Matter of	)	
	)	
PUBLIC UTILITIES COMMISSION	)	DOCKET NO. 2008-0273
	)	
Instituting a Proceeding to Investigate the Implementation of Feed-in Tariffs	)	
	)	

OPENING BRIEF
AND PROPOSAL FOR FEED-IN TARIFF
OF ZERO EMISSIONS LEASING LLC

AND
CERTIFICATE OF SERVICE

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ZERO EMISSIONS LEASING LLC ("Zero Emissions") respectfully submits this Opening Brief in support of Zero Emissions' Proposal for Feed-in Tariff (attached as Exhibit A) and answering each of the questions set forth in the memorandum prepared by National Regulatory Research Institute and transmitted to the parties on May 7, 2009 (the "NRRI Questions"), in the above-referenced docket.

OPENING BRIEF IN SUPPORT OF PROPOSAL FOR FEED-IN TARIFF

I. THE OVERARCHING QUESTION BEFORE THE COMMISSION IN THIS AND OTHER DOCKETS IS HOW TO MOVE MORE DECISIVELY AND IRREVERSIBLY TOWARD INDIGENOUSLY PRODUCED RENEWABLE ENERGY AT LOWER COSTS THAN WOULD BE INCURRED USING IMPORTED FOSSIL FUELS.

This docket was opened because the State of Hawaii[1] and the HECO Companies[2] agreed, in the Hawaii Clean Energy Initiative Agreement (the "HCEI Agreement")[3], that:

[1] Represented by Governor Linda Lingle, the Department of Business, Economic Development and Tourism and the Division of Consumer Advocacy of the Department of Commerce and Consumer Affairs.
[2] Hawaiian Electric Company, Inc., Maui Electric Company, Ltd. and Hawaii Electric Light Company, Inc.

- Hawaii's dependence on "imported fossil fuel" means "The very future of our land, our economy and our quality of life is at risk."[4]
- Hawaii should "move more decisively and irreversibly toward indigenously produced renewable energy" [5] to mitigate that risk;
- Hawaii's decisive and irreversible move to renewable energy could be made at "lower costs than would be incurred using imported fossil fuels"[6]; and
- Hawaii could "implement feed-in tariffs as a method of accelerating"[7] Hawaii's decisive and irreversible move to renewable energy.

The parties to the HCEI Agreement correctly identified an enormous problem facing the Hawaiian public – the risks to Hawaii's land, economy and quality of life from Hawaii's dependence on imported fossil fuel. Those parties also correctly identified the general solution to that problem – Hawaii's decisive and irreversible move toward indigenously produced renewable energy. The overarching question before the Commission – in this and other dockets opened pursuant to the agenda set forth in the HCEI Agreement – is how to achieve this move at "lower costs than would be incurred using imported fossil fuels."

II. WHAT IS THE BIG PICTURE?

Answering the big question – how to achieve Hawaii's decisive and irreversible move to renewable energy at lower costs than would be incurred using imported fossil fuels – requires a "big picture" understanding of existing and proposed policies affecting

[3] Energy Agreement Among the State of Hawaii, Division of Consumer Advocacy of the Department of Commerce and Consumer Affairs, and the Hawaiian Electric Companies (October 20, 2008)
[4] *Id.* at 1.
[5] *Id.* at 1.
[6] *Id.* at 1.

energy. Such policies can be divided broadly between policies concerning electricity versus policies concerning transportation fuels. Policies concerning electricity can be further divided between policies concerning supply of electricity versus policies concerning demand for electricity. Policies concerning transportation fuels can be further divided between policies concerning supply of such fuels versus policies concerning demand for such fuels. This "big picture" of existing and proposed policies affecting energy is shown in the table below:

	Electricity	**Transportation Fuels**
Supply	Net Energy Metering De-linked negotiated power purchase agreement rates Schedule Q avoided cost rates Income tax credits Competitive Bidding Renewable Portfolio Standard Feed-in Tariffs (proposed) PV Host Pilot Program (proposed)	Production tax credit Excise tax exemption Alternative fuel license tax rates Renewable fuel standard
Demand	Decoupling (proposed) Solar hot water and energy efficiency rebates Energy efficiency portfolio standards (proposed) Smart grid load curtailment (proposed) Advanced metering (proposed) Time-of-use rates (proposed)	Energy-efficient vehicle acquisition requirements, Biofuels procurement preferences

TABLE I: Hawaii Energy Policies

Answering the big question – how to achieve Hawaii's decisive and irreversible move to renewable energy at lower costs than would be incurred using imported fossil fuels – for renewable generation of electricity requires a "big picture" understanding of

[7] HCEI Agreement at 17.

the existing and proposed policies affecting "Electricity" "Supply," as shown in the upper left quadrant of Table I. Such policies can be divided broadly between policies concerning small-scale generation versus policies concerning large-scale generation. Policies concerning small-scale generation and policies concerning large-scale generation each can be divided further between policies that are ratepayer-funded and policies that are taxpayer-funded, as shown in Table II below:

	Small-scale Generation[8]	**Large-scale Generation**
Ratepayer-funded	Net Energy Metering (< 100 kW) Schedule Q avoided cost rates (< 100 kW) De-linked negotiated power purchase agreement rates (< 2.7 MW on Maui and Hawaii) HECO/CA Feed-in Tariff (proposed) (< 100 kW; < 500 kW for PV) PV Host Pilot Program (proposed) (> 500 kW and < 1000 kW for PV) Intervenors' Feed-in Tariff (proposed)	Renewable Portfolio Standard quotas, penalties and RECs Competitive Bidding rates Intervenors' Feed-in Tariff (proposed)
Taxpayer-funded	Renewable energy technology income tax credit (< 175 kW for PV)	[None]

TABLE II: Hawaii Renewable Generation Policies

The following observations can be made about the renewable generation policies shown in Table II:

- Hawaii has two policies – net energy metering (NEM) and the renewable energy technology income tax credit (RETIT Credit) – that have proven

[8] Table II omits photovoltaic rebates for customer-generators pursuant to Act 151, Session Laws Hawaii 2008, because the commission has not established a program for such rebates.

successful at encouraging development of small-scale renewable self-generation.[9]

- Hawaii has no policies that have proven successful at encouraging development of either small-scale or large-scale renewable generation for utility distribution.[10]
- The HECO/CA FIT appears intended to encourage development of small-scale renewable generation for utility distribution, and to discourage development of small-scale renewable self-generation through elimination of NEM.
- The HECO PV Host Program appears intended to achieve utility monopoly in the market for photovoltaic generation greater than 500 kW and less than 1000 kW, and to discourage development of PV generation by independent developers in that market.
- Intervenors' FIT is intended to encourage development of small-scale and large-scale renewable generation for utility distribution, and to encourage development of small-scale self-generation through retention of NEM.

III. THIS DOCKET PRESENTS THE COMMISSION WITH THREE DIFFERENT FIT OPTIONS FOR MOVING HAWAII MORE DECISIVELY AND IRREVERSIBLY TOWARD INDIGENOUSLY PRODUCED RENEWABLE ENERGY FROM RENEWABLE GENERATION.

[9] *See, e.g.*, the Net Energy Metering Status Report (the "NEM Report") filed by the HECO Companies on January 9, 2009 (4 MW of NEM PV systems placed in service in Hawaii during 2008).

[10] The record of the April 13 – 17, 2009 panel hearing in this docket (the "Panel Hearing") shows that Schedule Q avoided cost rates, Renewable Portfolio Standard renewable energy certificates (RECs), de-linked negotiated power purchase agreement rates and Competitive Bidding rates have not encouraged the development of any substantial amounts of renewable generation for utility distribution. Substantial amounts of renewable generation from geothermal and wind (e.g., Puna Geothermal Venture, Kaheawa wind, Tawhiri Power, Hawi Renewable Development) when HRS § 269-27.2 provided an avoided cost floor for the price of renewable electricity purchased by the utility, but the avoided cost floor of HRS § 269-27.2 was effectively repealed by the legislature in 2006 when the legislature changed the avoided cost floor to an avoided cost ceiling and required that future prices be "de-linked" from the cost of fossil fuel.

This docket presents the Commission with three different policy FIT options for moving Hawaii more decisively and irreversibly move toward indigenously produced renewable energy from renewable generation.[11] These three policy options are:

1) Do nothing, establish no feed-in tariff, and rely on existing policies to achieve Hawaii's more decisive and irreversible move toward renewable generation (the "No FIT Option");

2) Establish the feed-in tariff proposed by the HECO Companies and the Consumer Advocate (the "HECO/CA FIT"), and rely on the HECO/CA FIT, together with existing policies, to achieve Hawaii's more decisive and irreversible move toward renewable generation (the "HECO/CA FIT Option"); and

3) Establish the feed-in tariff proposed by a group of Intervenors (the "Intervenors' FIT"), and rely on the Intervenors' FIT, together with existing policies, to achieve Hawaii's more decisive and irreversible move toward renewable generation (the "Intervenors' FIT Option").

IV. INTERVENORS' FIT IS OF NET BENEFIT TO THE PUBLIC, BUT THE HECO/CA FIT IS OF NET COST TO THE PUBLIC.

A. "Clean energy scenario planning" is needed now, in this docket, to estimate the costs and benefits to the public of each of the No FIT Option, the HECO/CA FIT Option and Intervenors' FIT Option.

[11] Other options for moving Hawaii more decisively and irreversibly toward renewable generation would include (1) direct ratepayer-funded cash rebates for investment in new renewable generation, (2) indirect ratepayer-funded rebates in the form of cash received from the exchange of renewable energy certificates (RECs) used by the utility to avoid penalties for non-compliance with renewable portfolio standard (RPS) quotas, (3) increases or elimination of the system size limits and aggregate capacity limits on NEM, (4) taxpayer-funded subsidies, i.e., through government grants (e.g., for construction of undersea transmission cables) or government tax incentives such as tax credits and accelerated depreciation.

In choosing among the three options before the Commission – the No FIT Option, the HECO/CA FIT Option and the Intervenors' FIT Option – the Commission needs estimated figures for the amount of renewable generation that would be placed in service under each of these Options, and for the total costs and total benefits – to ratepayers specifically and to the public generally – of each of these options. The Commission needs these estimated figures to show that the costs of any FIT that it may adopt are "just and reasonable" in relation to the benefits of the FIT.

The HECO Companies and the Consumer Advocate have failed and refused to furnish such estimated figures.[12] The HECO Companies' and Consumer Advocate's failure and refusal is extraordinary given the HECO Companies' responsibility since 1992 under the Integrated Resource Planning (IRP) Framework to develop integrated resource plans "for meeting near and long term consumer energy needs in an efficient and reliable manner at the lowest reasonable cost" "upon consideration and analyses of the costs, effectiveness, and benefits of all appropriate, available, and feasible supply-side and demand-side options" and the Consumer Advocate's responsibility since 1992 to

[12] *See* the HECO Companies' and Consumer Advocate's joint Information Request Responses filed March 13, 2009, stating that: "no specific megawatt power capacity of renewable energy has been projected" in response to Zero Emissions Information Request ZE-IR-101 asking "How much renewable energy generating capacity expressed in megawatts, would you project the islands served by the Hawaiian Electric Companies to have in 5 years" under each of the No FIT Option, the HECO/CA FIT Option and the Intervenors' Option?; "the Companies have not quantified on a dollar basis the total cost of any additions of renewable energy generating capacity during the next 5-years" with respect to the No FIT Option and the HECO/CA FIT Option, and "it is difficult to quantify either the costs or benefits in dollars" associated with the Intervenors' FIT Option, in response to Zero Emissions Information Request ZE-IR-102 asking, "What would be the total cost to the ratepaying public and the total benefit to the ratepaying public, expressed in dollars, of any additions of renewable energy generating capacity on the islands served by the Hawaiian Electric Companies during the next 5 years" under each of the No FIT Option, the HECO/CA FIT Option and the Intervenors' Option?; and "it is not feasible to determine the cost to the public," in response to Zero Emissions Information Request ZE-IR-103, asking "What would be the cost to the public if Hawaii today experienced a cessation of imported petroleum for electric power generation and if Hawaii today had" the amount of renewable generation projected by the HECO Companies under each of the No FIT Option, the HECO/CA FIT Option and the Intervenors' Option?

ensure that each such plan "promotes the interest of utility consumers".[13] The HECO Companies' and the Consumer Advocate's evident failure to develop any capacity for providing such estimated figures—after 17 years of Integrated Resource Planning – inspires little confidence that the HECO Companies and the Consumer Advocate will achieve such a capacity in 2 or 3 years under their proposed "Clean Energy Scenario Planning."[14]

B. Zero Emissions' "clean energy scenario planning" shows projected rates of annual additions to renewable generation in Hawaii and net benefits and costs to the public under each of the No FIT Option, the HECO/CA FIT Option and the Intervenors' FIT Option.

Zero Emissions' rudimentary exercise in "clean energy scenario planning," set forth in Appendix 2, shows the following projected rates of annual additions to renewable generation and projected net benefits and costs to the public under each of the No FIT Option, the HECO/CA FIT Option and the Intervenors' FIT Option:

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[13] *Framework for Integrated Resource Planning* (the "IRP Framework"), Decision and Order No. 11630, filed May 22, 1992 in Docket No. 6617, section II.

[14] The HECO Companies' and the Consumer Advocate's failure and refusal to disclose any estimated figures in response to the Commission's PUC-IR-1, asking, "For each island, with the current levels of demand, transmission, and supply resources, what is the maximum amount of total and additional intermittent resources that can be accommodated without compromising reliability?" inspires even less confidence, even though the HECO Companies appear to have access to sophisticated models that would allow them to estimate such figures for the islands of Hawaii and Maui. *See* "Summary Report on Stakeholder Workshop" prepared for U.S. Department of Energy by GE Global Research and Hawaii Natural Energy Institute (November 2007); "Maui Electrical System Simulation Model Validation" prepared for U.S. Department of Energy by GE Global Research and Hawaii Natural Energy Institute (November 2008); T. Surles, "Hawaii Energy, Environment, and Sustainability: Aspects of grid Integration of as-Available Resources," prepared for APEC REGIS Workshop (January 13, 2009), accessed on May 25, 2009 at www.hnei.hawaii.edu/docs/publications/apec_regis_workshop_01132009%20.ppt.

	No FIT Option	HECO/CA FIT Option	Intervenors' FIT Option
Projected annual additions of renewable generation capacity	12 MW/yr	16 MW/yr	122.5 MW/yr
Projected annual additions of renewable electricity	35,171,273 kWh/yr	43,364,189 kWh/yr	359,089,439 kWh/yr
Number of years to achievement of 40% renewable electricity (~ 4,286 million kWh/yr)	122 years	99 years	12 years
Projected net benefit (cost) to ratepayers in $/kWh w/o energy security benefit	($0.000)	($0.006)	($0.008)
Projected net benefit (cost) to public in $/kWh w/ energy security benefit	$0.004	($0.000)	$0.026
Projected net benefit (cost) to public w/ energy security benefit	$211,561,852	($16,934,979)	$1,260,630,283

TABLE III: Rates of Annual Additions to Renewable Generation and Net Benefits and Costs of FIT Options

At the rates of about 40 million kWh/year at which renewable generation would be added under the No FIT Option and the HECO/CA FIT Option, it would take about 100 years (to year 2110) to achieve 4,286 million kWh/year of renewable generation,[15] commensurate with the 40% renewable energy goal of the HCEI Agreement. The No FIT Option and the HECO/CA FIT Option are not going to move Hawaii "more decisively and irreversibly" toward achievement of the 40% renewable energy by 2030 goal of the HCEI Agreement. The Intervenors' FIT Option, achieving about 360 million kWh/year of renewable generation, would move Hawaii "more decisively and

[15] 40% of Hawaii net electricity generation of 10,716 million kWh/year (per US Energy Information Administration State Energy Profile for Hawaii) equals 4,286 million kWh/year.

irreversibly" toward achievement of 40% renewable energy in about 12 years, that is, by about 2022.

C. Zero Emissions' "clean energy scenario planning" shows that the net benefit of Intervenors' FIT Option far exceeds the net benefit of the No FIT Option and the net cost of the HECO/CA FIT Option.

When energy security benefits are taken into account, and when the increased costs of capital resulting from the HECO/CA FIT's system size, quantity and expenditure caps are taken into account, the Intervenors' FIT Option generates a net benefit to the public of about $1.26 billion, whereas the status-quo No FIT Option generates a net benefit of about $212 million and the HECO/CA FIT Option generates a net cost (i.e., a negative net benefit) of about $17 million. Zero Emissions' cost-benefit analysis shows that the more decisively Hawaii moves to indigenously produced renewable energy -- with the Intervenors' FIT Option -- the greater will be the net benefit to the Hawaiian public – on the order of 6 times the net benefit of the No FIT Option.

The $.008/kWh projected net cost to ratepayers of Intervenors' FiT Option achieving approximately 17% renewable electricity for Hawaii[16] in 5 years is comparable to the approximate $.01/kWh cost of the German FiT that has achieved approximately 14% renewable electricity in Germany in about 7 years.[17] The Intervenors' FIT Option generates a net benefit to public of about $0.026/kWh that is more than 3 times its net cost to ratepayers of $.008/kWh.

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[16] 1,795,447,194 kWh/year of additional renewable electricity generation under Intervenors' FIT, as shown in Appendix 2, is equal to about 17% of Hawaii net electricity generation of about 10,716,000,000 kWh/year, as shown in the US Energy Information Administration State Energy Profile for Hawaii.

[17] D. Hinrichs, *Feed-in Tariff Case Studies: A White Paper in Support of the Hawaii Clean Energy Initiative* (Sentech, Inc. September 2008); Federal Republic of Germany Ministry for the Environment, Nature Conservation and Nuclear Safety, *Electricity from Renewable Energy Sources: What does it cost us?* (March 2008), accessed on May 30, 2009 at http://www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/brochure_electricity_costs.pdf .

When the increased costs of capital resulting from the HECO/CA FIT's system size, quantity and expenditure caps are taken into account, the HECO/CA FIT generates a *net cost* to the public (of about $17 million) even when the energy security benefit is taken into account. The public would be better off under the Intervenors' FIT Option (net benefit of $1.26 billion) than it would be under the No FIT Option (net benefit of $212 million), and would be better off under the No FIT Option (net benefit of $212 million) than it would be under the HECO/CA FIT Option (net cost of $17 million).

V. THERE ARE NO JUSTIFICATIONS FOR THE SIZE, QUANTITY AND EXPENDITURE CAPS IN THE HECO/CA FIT.

A. There are no technical limitations on interconnection justifying size, quantity, or expenditure caps.

There are no physical, technical, engineering, reliability, or interconnection limitations on the utility's ability to purchase renewable energy or the amount of renewable generation that can be interconnected with the grid. The only limitations on the amount of renewable energy that can be interconnected with the grid are economic – namely the cost of interconnecting renewable generation with the grid and the cost of improving the grid, if necessary, to accommodate such interconnection. Under Zero Emissions' Proposal for Feed-in Tariff at Appendix 1, such costs generally would be borne by the utility for small and medium-size projects, and would be borne by the renewable project developer for large projects. At the panel hearing, it was established that the only physical limitation on the amount of renewable generation that can be interconnected with the grid is the time availability of qualified electrical engineers hired by the utility to perform the interconnection requirements studies (IRSs).

B. There are no economic justifications for the size, quality, or expenditure caps in the HECO/CA FIT.

1. The size, quantity and expenditure caps in the HECO/CA FIT deprive the public of the energy security benefit.

Zero Emissions' cost-benefit analysis values the energy security benefit of additional renewable generation at $.40/kWh. The energy security benefit was obtained by measuring the mitigation value of each kilowatt-hour of additional renewable energy in terms of the Hawaii Gross Domestic Product that would be lost as a result of a 10% loss of oil imports for electricity generation in Hawaii during the next 5 years. The energy security benefit measures the economic value of mitigating the cost of Hawaii's dependence on imported oil for electricity generation.

Under the HECO/CA FIT, for every renewable kilowatt-hour that is precluded by the HECO/CA FIT's system size, quantity or expenditure caps, $.006 of ratepayer costs are saved, but $.40 of energy security benefits to the public are foregone. System size, quantity and expenditure caps cost the public more than 60 times what they save the ratepayers. They make no economic sense. That is why countries with successful FiTs – like Germany that has achieved 14% renewable electricity at an additional ratepayer cost of about $.01/kWh – do not have such caps.

2. Size, quantity and expenditure caps raise the cost of capital for renewable generation project development deferred by such caps.

FITs that do not have size, quantity and expenditure caps achieve rapid rates of renewable generation development at minimal cost to ratepayers because such FITs lower the cost of capital for project development by removing the market risks for a project (uncertainty that the customer will purchase, uncertainty of the price that will be

received) during a fixed period of time.[18] The longer this period of guaranteed sale at guaranteed prices, the lower the cost of capital.[19] In a comprehensive study of the cost-effectiveness of policies in 6 nations (Germany, France, Netherlands, United Kingdom, United States/California and Canada/Quebec) for encouraging renewable generation development, de Jager and Rathmann found that feed-in tariff policies, in places like Germany and France, that were not limited by size, quantity or expenditure caps, reduced the costs of capital for such development – reflected in reductions in the levelized cost of electricity ranging from 10% to 30% as compared to a default country that has no such policies in place.[20,21]

Size, quantity and expenditure caps, like those in the HECO/CA FIT, re-create the very market risks that a true FiT would eliminate: the risk that a project developer will not be able to sell renewable electricity to the utility at a predictable rate over a long period that gives the project investors an attractive return on their capital investment. Under the HECO/CA FIT, the utility would have the discretion, through the utility's CESP decision-making process, to specify the amounts of such caps on an annual basis. Giving the utility discretion to specify the amounts of such caps on an annual basis means

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[18] *See* D. de Jager and M. Rathmann, *Policy Instrument Design to Reduce Financing Costs in Renewable Energy Technology Projects*, commissioned by the International Energy Agency – Renewable Energy Technology Deployment (ECOFYS, Utrecht, October 2008) at 127, accessed on May 30, 2009 at http://www.iea-retd.org/files/RETD_PID0810_Main.pdf .

[19] *Id.*

[20] De Jager and Rathmann state:

... Commitment, stability, reliability and predictability are all elements that increase confidence of market actors, reduce regulatory risks, and hence significantly reduce cost of capital and overall societal cost. A proper translation of this commitment in the design and timeframe of the support instruments, is the key challenge in this respect. In the previous chapter we have shown that the effect can be significant: reductions in levelised cost of electricity can be achieved ranging from 10 to 30% as compared to a default country that has no particular ... policies in place. *Id.* at 119.

[21] De Jager and Rathmann found that the reduction in the levelized cost of PV electricity as compared to the default country were 30% in Germany and France as a consequence of the feed-in tariff design scheme (having no caps) and its 20 year term. *Id.* at 113.

giving the utility discretion to decide how much renewable electricity it will purchase from what sources at FIT rates in any given year.

The utility's discretion to specify the size, quantity and expenditure caps on an annual basis under the HECO/CA FIT means that a project developer faces the same market risk under the HECO/CA FIT that the developer faces if no FIT is in place: the risk that, if the utility next year specifies a size, quantity or expenditure cap that places the utility under no obligation to purchase renewable electricity from the project that the developer starts developing this year, the project developer will not be able to sell renewable electricity to the utility at a predictable rate over a long period that gives the project investors an attractive return on their capital investment.

Establishing a fake FIT, like the HECO/CA FIT with size, quantity and expenditure caps set at the discretion of the utility, will be worse for the ratepayers and the public than establishing no FIT at all because, once a fake FIT is established that gives project developers and their prospective investors zero predictability that they will be able to sell the renewable electricity to the utility, when a true FIT is later established, such investors will demand a premium return on their capital investment in Hawaii renewable generation (raising the cost of capital ultimately borne by ratepayers and the public) to compensate investors for the risk that the utility and the commission, having once established a fake FIT, will do something to undermine the credibility and predictability of the true FIT. This is the basis for the added capital cost component for the HECO/CA FIT shown in Zero Emissions' cost-benefit analysis at Appendix 1, which equates the risk premium demanded by investors under a fake FIT with the reduction in the cost of capital under a true FIT, measured by de Jager and Rathmann as a 10% to 30% reduction in the levelized cost of renewable electricity.

3. Size, quantity and expenditure caps deprive the public of job creation and other fiscal benefits of more decisive renewable generation development.

Size, quantity and expenditure caps deprive the Hawaiian public of the jobs and economic benefits that result from rapid development of large-scale renewable generation because such caps restrict the rate of such development. A study by The Vote Solar Initiative[22] estimated the following jobs and economic benefits from the development of 2,000 MW of concentrating solar power (CSP) generation in Nevada:

Projected Economic Benefits 2,000 MW CSP	**Total Benefits ($2009) 30 Year Life**
Permanent Full-Time O&M Jobs	**1,200 jobs**
Construction Phase Jobs (avg/yr for 6 years)	**5,900 jobs/yr**
Lifetime Earnings	**$5.0 billion**
Lifetime Economic Output	**$10.7 billion**
Lifetime Sales & Property Taxes Paid (w/proposed abatements)	**$500 Million**

Size, quantity and expenditure caps, like those contained in the HECO/CA FIT, would deprive the Hawaiian public of about 500 MW of renewable generation that otherwise would be achieved under Intervenors' FIT over the next 5 years. Pro-rating the figures from the Vote Solar Study in a 1-to-4 ratio (500 MW of Hawaii renewable generation to 2000 MW of Nevada CSP generation), such caps would deprive the Hawaiian public of about 300 full-time O&M jobs, about 1500 construction-phase jobs, about $2.7 billion in economic output and about $125 million in tax revenues over the

[22] The Vote Solar Initiative, "The Sun Rises on Nevada: Economic and Environmental Impacts of Developing 2,000 MW of Large-Scale Power Plants," (March 2009), accessed on May 25, 2009 at http://www.votesolar.org/linked-docs/TheSunRisesOnNevada_Report.pdf (the "Vote Solar Study").

next 5 years. When one adds the cost of these foregone benefits to the cost of foregone energy security benefits, one has to ask: What compelling benefit do such caps achieve that justifies the sacrifice of these job, economic and energy security benefits?

4. Size, quantity and expenditure caps deprive the public of environmental benefits from more decisive development of renewable generation.

Size, quantity and expenditure caps, like those in the HECO/CA FIT, deprive the public of the environmental benefits of rapid development of renewable generation because such caps retard the development of renewable generation. Such environmental benefits are economically measurable. The ASPv study[23] attributed values ranging from $.004/kWh to $.019/kWh for environmental benefits (health benefits, avoided NO_x emissions, avoided CO_2 emissions and avoided water use) of PV electricity. The Vote Solar Study[24] estimated that avoided NO_x and CO_2 emissions had a value of $.033/kWh in avoided environmental costs.

VI. THE CLAIMED JUSTIFICATIONS FOR SIZE AND QUANTITY LIMITS IN THE HECO/CA FIT ARE INCONSISTENT WITH THE CLAIMED JUSTIFICATIONS FOR THE HECO COMPANIES' PROPOSED PV HOST PROGRAM.

The HECO/CA FIT's assertions -- that interconnection requirements study (IRS) time, permitting time, accounting time and ratepayer impacts justify size limits of 500 kW and a quantity limits of 6.5 MW for utility-distributed solar PV generation under the HECO/CA FIT – are belied by the HECO Companies' proposed PV Host Pilot Program,

[23] *See* endnote ll, *infra*.
[24] *See* E. Smeloff, "Quantifying the Benefits of Solar power for California," (The Vote Solar Initiative, January 2005) (the "Vote Solar" study).

which proposes utility-sponsored development of PV system sizes of 500 kW to 1 MW and additions of 16 MW.

The PV Host Pilot Program raises the following questions relative to the FIT:

Why are IRS time, permitting time, accounting time and unquantified ratepayer impacts reasons to limit development of utility-distributed solar PV to < 500 kW and less than 6.5 MW under the HECO/CA FIT, but not reasons to limit development of utility-distributed solar PV to < 500 kW and less than 6.5 MW under the PV Host Pilot Program?

Why is the utility asking for ratepayer funds under the PV Host Pilot Program to monopolize utility-distributed solar PV generation > 500 kW, but opposed to a FIT under which the utility would have the same opportunity as non-utility PV generators to obtain an attractive return on investment of its own funds in the development of utility-distributed solar PV > 500 kW?

VIII. HAWAII NEEDS A TRUE FEED-IN TARIFF TO REACH ITS RENEWABLE ENERGY GOALS AT MINIMUM COST TO RATEPAYERS AND MAXIMUM BENEFIT TO THE PUBLIC.

The purpose of the feed-in tariff is to accelerate the speed and size of renewable generation development in Hawaii at minimum cost to ratepayers and maximum benefit to the public by obliging the utility to purchase renewable electricity at long-term rates that provide an attractive return to investors. A true FIT is a must-take obligation of the utility, not a "program" or "procurement mechanism" with size, quantity and expenditure caps administered in the discretion of the utility.

The utility's 100% monopoly in the Hawaii market for transmission and distribution of electricity gives the utility 100% monopsony power in the Hawaii market for grid-distributed renewable electricity. The utility's monopsony power in that market – that is, the utility's discretion to refuse to purchase renewable electricity in that market – is the primary barrier to achievement of Hawaii's goal "to move more decisively and irreversibly toward indigenously produced renewable energy" at lower costs than would be incurred using fossil fuels. A true FIT, like Intervenors' FIT, achieves that goal by obliging the utility to purchase renewable electricity, thus breaking the utility's monopsony power that is holding back renewable generation development in Hawaii.

ANSWERS TO NRRI QUESTIONS

I. Caps and cost containment mechanisms

A. Should the Commission determine a total "budget" for FiT purchases? Should this budget be in terms of a total amount of dollars in cost that ratepayers should incur to support these purchases, or in terms of a total quantity of purchases? Or both? Over what period of time should this budget apply?

No. The Commission should not determine a total "budget" or expenditure cap for FiT purchases because such an expenditure cap would destroy the cost-effectiveness of the FIT by creating revenue uncertainty for renewable generation project development both above and below the cap, driving up the cost of capital for such development, and reducing the amount and speed of such development. A total budget or expenditure cap for FiT purchases would impose enormous costs on the public by depriving the public of the "energy security benefit" that would result from a decisive and irreversible move to indigenously produced renewable energy. An expenditure cap contains ratepayer costs by exposing the public to energy insecurity costs (i.e., foregone energy security benefits at $.40/kWh) that are more than 60 times larger than the ratepayer costs (of about $.006/kWh under the HECO/CA FIT) that are being "contained," as shown in Zero Emissions' cost-benefit analysis.

B. In determining a budget, how should the Commission quantify the value of indirect (e.g. security, environmental and business development) benefits of the FiT?

In determining whether to establish a total budget or expenditure cap, the Commission should quantify the value of the energy security benefit, which is the direct and primary benefit of the FiT, in the manner used in Zero Emissions' cost-benefit

analysis, *supra*. Zero Emissions' cost-benefit analysis values the energy security benefit at $.40/kWh.

C. What should be the appropriate relationship between (a) the Commission's decision in the present FiT proceeding, and (b) the Commission's decision in the CESP proceeding (where it will determine an integrated strategy for reducing fossil fuel use)? Focusing on the parameters of cost and quantity of renewables purchased under an FiT, is it necessary or desirable for the Commission to make all decisions now (prior to the CESP outcome); or is it more desirable for the Commission to view its present decision in this FiT proceeding as a beginning, to be revisited once the CESP proceeding provides a clearer view about which measures produces the greatest returns, in terms of cost-effective fossil fuel use reduction?

The Commission should make a decision now, in the present FiT proceeding, establishing a true feed-in tariff, like Intervenors' FiT, that is uncapped by size, annual quantity or annual expenditure limits, other than the economically justifiable grid penetration limits in Intervenors' FIT. The Commission should not wait to make a decision in the CESP proceeding before making a decision to establish a true feed-in tariff because CESP is unlikely to ever result in "an integrated strategy for reducing fossil fuel use" or "a clearer view about which measures produces the greatest returns, in terms of cost-effective fossil fuel use reduction."

CESP is just a new name for Integrated Resource Planning (IRP). In 17 years of IRP, the utilities and the Consumer Advocate failed to come up with an integrated strategy for reducing fossil fuel use. IRP has been a strategy-making failure because it was set up to ensure that the utility retained decision-making authority over its resource planning, to ensure that the utility would not be obliged to disclose information about its decision-making to non-utility participants, and to ensure that non-utility participants' role was strictly advisory with no meaningful remedies or means of obtaining review of

the utility's planning decisions. IRP has been such a planning and modeling failure that the utilities could not even answer the Commission's PUC-IR-1 in this docket asking what amounts of intermittent renewable generation could be added to the grid without compromising grid reliability. If the utilities and the Consumer Advocate could not come up with such a strategy in 17 years of IRP, there is little reason to believe that they will come up with such a strategy in CESP. Waiting years for the utility to propose such a strategy in the CESP docket is unlikely to move Hawaii more decisively and irreversibly toward indigenously produced renewable energy.

D. Concerning the budget cap:

1. If the Commission adopts a cost-based cap, how should it mathematically define "cost"?

If the Commission adopts a cost-based cap, the Commission should define "cost" as the product of the quantity of renewable energy delivered to the utility (or the quantity of renewable energy that would have been delivered but for curtailment) times the applicable FiT rate.

a. If included in the cost calculation, how should the Commission define "avoided cost"?

"Avoided cost" should be included in the FIT cost-benefit analysis using the definition for "avoided cost" that the utility uses in reporting monthly "avoided cost" data to the Commission.[25]

b. What additional ratepayer costs (e.g. administrative and contractual penalties) associated with the FiT should be included in the FiT cost calculation and how should they be determined?

[25] *See* May 2009 Avoided Energy Cost Data filed on April 30, 2009 by the HECO Companies.

Administrative and contractual penalties should not be included in the FiT cost-benefit analysis because such penalties should not be included in the FiT, or, if such penalties are included in the FiT, the costs of such penalties should not be borne by ratepayers. Inclusion of such penalties in the FiT would vitiate the cost-effectiveness of the FiT by increasing the risks and, therefore, the costs of capital for developers of renewable generation projects. The only costs that should be borne by ratepayers are the costs of purchasing renewable energy at the FiT rate.

c. What direct benefits (e.g. reduced black-start costs) should be included in the FiT cost calculation and how should they be determined?

Distributed generation benefits, including reliability benefits like reduced black-start costs, are direct benefits that should be included in the FiT cost-benefit analysis. Zero Emissions cost-benefit analysis at Appendix 2 values such distributed generation benefits at $.0744/kWh for solar power, $.015/kWh for wind power, $.059/kWh for biogas and landfill gas power, $.066/kwh for biomass power and $.028/kWh for geothermal power.

2. If the Commission adopts cost-based caps, over what duration should the initial cap apply (e.g. annual caps or one cap until the next reevaluation)?

Duration of an initial cost-based expenditure cap should be no more than one year, by which time the Commission might conclude that a cost-based expenditure cap serves no purpose other than to limit the amount, slow the speed and increase the cost to the public of renewable generation development.

3. If the Commission adopts cost-based caps, what should the initial cap be?

If the Commission adopts a cost-based expenditure cap, the initial expenditure cap should be $1,256,159,321, which is the projected total amount of utility purchases of renewable energy during the first 5 years of Intervenors' FIT, as shown in Zero Emissions' cost-benefit analysis at Appendix 2.

4. If the Commission adopts quantity-based caps, how should it mathematically define "quantity" (e.g. installed capacity or projected kWh)?

If the Commission adopts a quantity-based cap, such as a cap on the amount of intermittent renewable generation that might be added to each island grid, any such cap should be defined in megawatts (MW) of installed capacity. A cap on the amount of intermittent renewable generation that might be added to each island grid, like the 25% grid penetration cap for wind[26] and the 20% grid penetration cap for solar[27] proposed by Intervenors' FIT, should be defined in MW of installed capacity as a percentage of peak load in MW for each such grid. Island-wide grid penetration caps for intermittent renewable generation are justified to contain ratepayer costs because it does not make sense to oblige the utility and ratepayers to pay for renewable generation from intermittent sources (solar and wind) if such renewable generation displaces no fixed

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[26] *See* B. Parsons, M. Milligan, J.C. Smith, E. DeMeo, B. Oakleaf, K. Wolf, M. Schuerger, R. Zavadil, M. Ahlstrom and D. Yen Nakafuji, "Grid Impacts of Wind Power Variability: Recent Assessments from a Variety of Utilities in the United States," National Renewable Energy Laboratory Conference Paper NREL/CP-500-39955 (July 2006) http://www.uwig.org/Ewec06gridpaper.pdf ; J.C. Smith, B. Parsons, T. Acker, M. Milligan, R. Zavadi, M. Schuerger and E. DeMeo, "Best Practices in Grid Integration of Variable Wind Power: Summary of Recent US Case Study Results and Mitigation Measures," presented at Europe Wind Energy Conference '07, Milan Italy (May 2007) http://www.wapa.gov/UGP/PowerMarketing/WindHydro/EWEC07paper.pdf.

[27] *See* P. Denholm and R.Margolis, "Very Large-Scale Deployment of Grid-Connected Solar Photovoltaics in the United States: Challenges and Opportunities," National Renewal Energy Laboratory Conference Paper NREL/CP-620-39683 (April 2006) http://www.nrel.gov/pv/pdfs/39683.pdf; Paul Denholm and Robert M. Margolis, "Evaluating the limits of solar photovoltaics (PV) in traditional electric power systems," 35 Energy Policy 4424-4433 (Elsevier, September 2007).

generation from imported fuels because of the need to maintain such fixed generation to maintain present-day levels of grid reliability.

5. If the Commission adopts quantity-based caps, over what duration should the initial cap apply (e.g. annual caps or one cap until the next reevaluation)?

If the Commission adopts a quantity-based cap, such as the grid penetration cap for renewable generation proposed in Intervenors' FiT, the initial cap should apply until interconnection applications have been received for the initial cap amount, at which time the Commission should re-evaluate the economic basis for any increase in the cap amount.

6. If the Commission adopts quantity-based caps, what should the initial cap be?

If the Commission adopts quantity-based caps, the initial caps should be grid penetration caps equal to 25% of island-wide peak load for wind generation and 20% of island-wide peak load for solar generation.[28]

E. How should the Commission allocate any cost or quantity caps among technologies, project sizes and islands (e.g. no restrictions or carve-outs)?

The Commission should allocate any grid penetration quantity caps for intermittent renewable generation on the basis of percentage of island-wide peak load for each island.

F. Should FiT rates increase based on milestones, decrease based on milestones, or remain constant between periodic reexaminations? What milestones?

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[28] *See* notes 26 and 27, *supra*.

FIT rates should remain constant between periodic reexaminations. Milestones should not be used to set FiT rates, but should be used to order the queue for interconnection requests.[29]

II. Reliability considerations

A. Should the Commission require the utility to propose, for Commission approval, transparent reliability standards that the utility would apply to determine:

1. when additional intermittent generation can or cannot be added to islands or circuits without compromising system security, and

No. Existing reliability standards (i.e., Rule 14H) are adequate for utility determination whether additional intermittent generation can or cannot be interconnected to island grids without compromising grid security.

2. if specific renewable energy projects would compromise system security?

No. Existing reliability standards (i.e., Rule 14H) are adequate for utility determination whether interconnection of specific renewable energy projects would compromise grid security.

B. Should the Commission require an independent monitor to oversee the utility's reliability determinations as related to the FiT?

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[29] *See* Midwest Independent Transmission System Operator ("Midwest ISO"), Generator Interconnection Process Tariff (August 25, 2008) http://www.midwestmarket.org/publish/Document/25f0a7_11c1022c619_-7d600a48324a/Attachment%20X%20GIP.pdf?action=download&_property=Attachment; Midwest ISO, Business Practices Manual: Generator Interconnection (Manual No. 15, TP-BPM-004-r2, January 6, 200p) http://www.midwestmarket.org/publish/Document/45e84c_11cdc615aa1_-7e010a48324a; Working group for Investment in Reliable & Economic electric Systems (WIRES), Integrating Locationally-Constrained Resources Into Transmission Systems: A Survey of U.S. Practices (October 2008) http://www.wiresgroup.com/images/WIRES_Report_LCR.pdf; 124 FERC ¶ 61,183, Midwest Independent Transmission System Operator, Inc., Docket No. ER08-1169-000, Order Conditionally Accepting Tariff Revisions and Addressing Queue Reform (August 25, 2008) http://elibrary.ferc.gov/idmws/doc_info.asp?document_id=13641108

No. The Commission should not require an independent monitor to oversee the utility's reliability determinations as related to the FIT because the FIT is a price specification, not a technical or reliability specification for interconnection of renewable generation. The Commission might consider opening a new docket to investigate interconnection requirements studies (IRSs) under Rule 14H and establish procedures for speedy resolution of disputes over interconnection and allocation of interconnection costs between the utility and the renewable generator.

III. FiT eligibility

A. Which technologies should be eligible for the initial FiT?

Commercially proven renewable energy generation technologies should be eligible for the initial FiT.

1. Please identify the technologies you believe should be eligible, and why.

The following technologies should be eligible for the initial FiT because they are commercially proven:

Biomass and biogas
Geothermal energy
Landfill gas or sewage treatment plant gas
Hydropower
Photovoltaic
Concentrating solar
Onshore wind
Offshore wind

2. For technologies or technology/size combinations without Hawaii commercial experience, how can the Commission obtain or estimate reliable cost and performance information to calculate FiT rates?

For technologies or technology/size combinations without Hawaii commercial experience, the Commission can obtain or estimate reliable cost and performance information from foreign jurisdictions that have established FiTs which have led to successful development of projects using such technologies or technology/size combinations.

3. Should hybrid projects using biofuels be eligible for the FiT if biofuels are not included in the initial FiT?

No. Hybrid projects using biofuels should not be eligible for the FIT if biofuels are not included in the initial FiT because an initial FiT that includes indigenously produced biofuels only if hybridized with imported fossil fuels or imported biofuels would not move Hawaii more decisively and irreversibly toward indigenously produced renewable energy.

4. Should hybrid projects using conventional fuels be eligible for the FiT? If so, should all of the energy produced by such projects receive FiT rates?

No. Hybrid projects using conventional fuels should not be eligible for the FiT because a FiT that includes imported fossil fuels or imported biofuels would not move Hawaii more decisively and irreversibly toward indigenously produced renewable energy.

B. What sizes of projects should be eligible for the initial FiT?

Projects of all sizes should be eligible for the initial FiT, subject only to island-wide grid penetration caps for intermittent renewable generation and aggregate renewable generation caps equal to island-wide peak load for each island.

C. Should existing Schedule Q or negotiated PPA projects be eligible for the FiT?

Yes. Existing Schedule Q and negotiated PPA projects using renewable energy technologies otherwise eligible for the FiT should be eligible for the FiT if the Commission concludes that the cost to ratepayers of renewable energy from such projects under the FiT over the next 20 years is likely to be no more than the cost to ratepayers of such energy under Schedule Q or the existing PPAs over the next 20 years.

1. If existing projects are eligible for the FiT, how, if at all, should the term of the FiT differ from those offered to new projects (e.g. take into account years of prior operation)?

If the Commission decides that existing projects should be eligible for the FiT because the cost to ratepayers under the FIT is likely to be no more than the cost to ratepayers under Schedule Q or existing PPAs over the next 20 years, the term of the FiT offered to such projects should be 20 years and should not differ from the FiT term offered to new projects.

2. If existing projects are eligible for the FiT, how, if at all, should the FiT rates differ from those offered to new projects?

If the Commission decides that existing projects should be eligible for the FiT because the cost to ratepayers under the FIT is likely to be no more than the cost to ratepayers under Schedule Q or existing PPAs over the next 20 years, the FiT rate offered to such projects should not differ from the FiT rate offered to new projects.

D. Should the FiT be available for incremental additions to existing projects?

Yes.

E. Under what conditions, if at all, should utility affiliate-owned projects be eligible for the FiT?

Utility affiliate-owned projects should be eligible for the FiT, provided that (1) the utility, as a transmission & distribution entity, is obliged to take, purchase and pay for renewable energy delivered by the utility affiliate on the same terms as renewable energy delivered by an independent renewable energy generator, and (2) the Commission establishes a queuing procedure for interconnection priority that is uniformly applicable to projects owned by the utility affiliate and projects owned by independent renewable energy generators.

IV. Setting rates

A. What costs should the FiT cover (e.g. only the most cost-effective projects, typical projects or most projects)?

The FiT rates should be based on typical project costs, plus a return sufficient to induce rapid development of large-scale renewable generation.

B. What should the rate of return be for FiT projects?

The rate of return for FiT projects should be sufficient to induce rapid development of large-scale renewable generation at low cost to the ratepaying public. Zero Emissions believes that the rates in Intervenors' FiT would provide a rate of return sufficient to induce annual additions about 122.5 MW/year and about 360 million kWh/year of renewable generation at an additional cost to ratepayers of about $.008/kWh, as shown in Zero Emissions' cost-benefit analysis at Appendix 2.

1. How, if at all, should the returns for different projects reflect varying risks and cost of capital for different technologies?

The returns for different projects naturally will reflect varying risks and costs of capital for different technologies used by such projects. Different FiT rates should be set for different technologies and different project sizes, as they are under Intervenors' FiT, to reflect varying costs, including varying costs of capital, for different technologies, to reflect returns adequate to compensate investors for project development risks, and to induce rapid development of large-scale renewable generation at low cost to the ratepaying public and maximum benefit to the general public.

2. Should the implied returns in the FiT decline over time?

The implied returns in the FiT should decline over time if the Commission establishes and maintains a true feed-in tariff like Intervenors' FiT that is not limited by size caps, expenditure caps or quantity caps, other than the island-wide grid penetration limits for intermittent renewable generation and the island-wide peak load limit for aggregate renewable generation contained in Intervenors' FiT. If the Commission establishes and maintains a true feed-in tariff, the implied returns demanded by investors should decline over time as costs of capital decline over time because investors perceive diminished policy risks over time.

C. What information should the Commission use to determine the initial FiT rates (e.g. based only on Hawaii-specific information, based on adjusted mainland information or based on European FiTs)?

To determine the initial FiT rates, the Commission should use: (1) information about PPA rates that have proven sufficient to induce investment in renewable energy projects in Hawaii (such as the PPA rates for the PV projects developed by Hoku Solar to provide solar electricity to the Airports Division of the Hawaii Department of Transportation), (2) information about PPA and FiT rates that have proven sufficient to

induce investment in renewable energy projects on the mainland United States and Puerto Rico, and (3) information about FiT rates that have proven sufficient to induce investment in renewable energy projects in places such as Europe, Canada, Brazil and the Caribbean.

D. If the Commission decides to calculate FiT rates based on cost and performance information, who should gather and analyze Hawaii-specific cost information (e.g. HECO or an independent consultant)?

If the Commission decides to calculate FiT rates based on cost and performance information, the Commission should gather and analyze Hawaii-specific cost information, possibly with the help of an independent consultant.

E. If the Commission decides to calculate FiT rates based on cost and performance information, what formula (e.g. the DCF formula proposed by HECO) should be used to determine FiT rates?

To determine FiT rates, the Commission should use information about PPA and FiT rates that have proven successful in Hawaii and elsewhere in attracting investment in large-scale renewable generation, and then use discounted cash flow (DCF) analysis based on cost and performance information to determine the likely cost-effectiveness of the proposed FiT rates.

F. If the Commission adopts a tiered approach (i.e., non-complicated projects receive an FiT rate and simplified processes while complicated projects receive an FiT rate and non-simplified processes), as discussed in the FiT hearing, should the IRS studies be mandatory for large but not small projects?

No. IRS studies should not be mandatory for any projects on the basis of project size. IRS studies should be required only for projects where the utility and/or the

developer has a reasonable basis for believing that interconnection of the project would create a non-trivial risk to the safety or reliability of the grid.

1. Should the utility pay for any IRS studies for small projects?

Yes. The utility should pay for IRS studies for small projects, as shown in the "Interconnection Costs" table in Zero Emissions' Proposal for Feed-in Tariff at Appendix 1.

2. Should the utility pay for any IRS studies for large projects?

No. The utility should not pay for IRS studies for large projects as shown in the "Interconnection Costs" table in Zero Emissions' Proposal for Feed-in Tariff at Appendix 1.

3. Should the utility pay for, or compensate through FiT rates, any project-side modifications and/or additional requirements resulting from the IRS study for small projects?

Yes. The utility should pay for project-side modifications and/or additional requirements resulting from IRS studies for small projects, as shown in the "Interconnection Costs" table in Zero Emissions' Proposal for Feed-in Tariff at Appendix 1.

4. Should the utility pay for, or compensate through FiT rates, any project-side modifications and/or additional requirements resulting from the IRS study for large projects?

Yes. The utility should pay for project-side modifications and/or additional requirements resulting from IRS studies for large projects, as shown in the

"Interconnection Costs" table in Zero Emissions' Proposal for Feed-in Tariff at Appendix 1.

G. How should the FiT rates consider accelerated depreciation?

The FiT rates should not consider accelerated depreciation because accelerated depreciation has little value other than to certain kinds of investors (widely-held C corporations and recipients of net passive income) that are not limited by US passive activity rules.

H. How should the FiT rates consider state tax credits?

The FiT rates should not be discounted to reflect Hawaii state tax credits. A project should not be eligible to receive the FiT rate if the project owner receives the Hawaii renewable energy technology income tax credit.

I. Should FiT projects be eligible to receive non-tax benefits from state or utility programs (e.g. rebates)?

Yes. An FiT project should be eligible to receive non-tax benefits such as rebates from state or utility programs if the project qualifies under the terms of those programs.

J. Should the FiT rates for new projects automatically adjust for changes in federal or state tax credits?

No. FiT rates for new projects should not be automatically adjusted for changes in federal or state tax credits because the actual financial effects of such changes might depend on subjective interpretations of the law. Creating a set of automatic adjustments for such changes would likely be a complex task because the actual financial effects of such changes would be difficult to predict at any time before the changes come into effect.

K. Should the FiT assume any residual value for the projects at the conclusion of the FiT?

No. For purposes of setting the FiT rate, the FiT should not assume any residual value for the projects at the conclusion of the FiT because any assumption by the Commission about residual value 20 years in the future would be entirely speculative.

1. How should the Commission determine any residual value for the projects at the conclusion of the FiT?

The Commission should not determine any residual value for the projects at the conclusion of the FiT because any determination by the Commission of residual value 20 years in the future would be entirely speculative.

2. How should projects be compensated for energy sales after expiration of their FiT term if FiT rates include, or exclude, an imputed residual value? Should the Commission address this issue now, or later?

Projects should be compensated for energy sales after the expiration of their FiT terms according to whatever terms of sale might be negotiated between the utility and the project owner at the time of such expiration, regardless of whether FiT rates include or exclude an imputed residual value, because the projects are the property of the owner and developed at the risk of the owner, who is entitled to whatever value (including compensation for energy sales) that might be obtained from ownership of the projects after expiration of the FiT term. Any compensation for any such energy sales under a negotiated power purchase agreement made 20 years in the future should be addressed by the Commission when the Commission reviews such an agreement 20 years in the future.

L. Should the initial FiT rates be time-differentiated?

The initial FiT rates should not be time-differentiated because time-differentiation of FiT rates, in the absence of a well thought-out system of time-differentiated rates applicable to all energy purchases by the utility, would be likely to add to the complexity and impair the cost-effectiveness of the FiT.

M. Should different FiT rates be created for each island?

Different FiT rates for each island should be created for PV solar and CSP, and should not be created for other renewable energy technologies, as shown in Intervenors' FiT.

N. How should initial FiT rates account for reliability benefits or lack there of from certain projects?

Initial FiT rates for renewable generation should not account for reliability benefits or lack of such benefits from certain projects and/or technologies because reliability benefits are a return to the utility and ratepayers, not to the project developer. If, however, the Commission wants to encourage especially rapid development of firm or dispatchable renewable generation projects that provides reliability benefits, the Commission might set initial FiT rates which incorporate a premium for technologies and project sizes that provide such reliability benefits. The Commission should set an initial FiT rate for energy storage technologies, as shown in Zero Emissions' Proposal for Feed-in Tariff at Appendix 1, to induce the development of energy storage projects that provide such reliability benefits.

O. How should FiT projects be compensated for curtailment?

Under Intervenors' FIT, projects should be compensated at FiT rates for all renewable energy that would have been generated and delivered to the utility but for curtailment.

P. What baseline rates, if any, should the Commission provide for technologies without FiT rates?

For non-commercially proven technologies, the Commission should provide a baseline FiT rate equal to the lowest of the FiT rates for commercially proven technologies having their own FiT rates.

Q. How should the FiT rates account for inflation?

FiT rates should not account for inflation. FiT rates should be levelized over the 20 year FiT term. It is up to the project investor to decide whether the levelized FiT rate provides an adequate return based on the investor's inflation expectations.

R. When, if ever, should the FiT rates adjust mid-course for existing FiT projects (e.g. increases in curtailment or input costs)?

FiT rates should not be adjusted mid-course for existing FiT projects, with the possible exception of *force majeure* circumstances that include currency hyperinflation.

V. Process and non-rate terms

A. What should be the duration of the utility's obligation to buy under the FiT?

The duration of the utility's obligation to buy renewable energy under the FiT should be 20 years commencing with initial delivery of renewable energy to the utility.

B. When should the Commission first update the initial FiT, for application to future projects?

The Commission should first update the initial FiT on the second anniversary of the initial FiT, for application of the FiT to future projects.

C. After the first update, on what intervals should the Commission reexamine the FiT?

After the first update, the Commission should re-examine the FiT at intervals of 3 years.

D. In what situations, if any, should parties be able to petition for changes in the FiT between these previously scheduled reexaminations?

The Commission might consider allowing the parties to petition for changes in the FiT between re-examinations based on *force majeure* or extraordinary circumstances such as currency hyperinflation.

E. What cost and performance information should the Commission require that project developers provide for FiT projects?

The Commission should require that project developers provide information about the capital and operating costs of the project, and the kilowatt-hours of renewable energy generated by the project or that would have been generated by the project but for curtailment.

F. Concerning existing PPAs, for projects that do not switch to the FiT program: What, if any, compensation should they receive for curtailment, (a) arising from the introduction of FiTs or (b) that would have occurred without introduction of the FiTs? Does this question belong in this FiT case or does it belong in a case initiated by a project owner for revision of its existing PPA?

For existing PPA projects that do not switch to FiT rates, such projects should receive whatever compensation, if any, that is provided in the existing PPAs.

Distinguishing curtailment arising from introduction of FiTs, from curtailment that would have occurred without the introduction of FiTs, would likely be a complex and contentious task. This question does not belong in this FiT case, but might belong in a case initiated by a project owner seeking revision of its existing PPA.

G. What queuing and interconnection processes should the utility utilize?

The utility should utilize an interconnection queuing process modeled after the first-ready, first-served queuing process of the Midwest ISO.

H. Should the Commission provide queuing priority for projects with reliability benefits?

No. The Commission should not provide queuing priority for projects with reliability benefits because reliability is a benefit for the utility and ratepayers, not a benefit for the project developer. Queuing priority should benefit project developers whose projects achieve milestones for rapid project development. If the Commission wants to encourage especially rapid development of firm or dispatchable renewable generation projects that provide reliability benefits, the Commission might set initial FiT rates which incorporate a premium for technologies and project sizes that provide such reliability benefits.

I. Who should receive the value of RECs or other green attributes from FiT projects? How should an FiT rate reflect the answer to this question?

The project owner should receive the value of RECs or other green attributes from FiT projects because the project owner who took the risk in developing the renewable energy project is entitled to the rewards of the project, including the value of any

environmental credits associated with the project in any market set up for the exchange of such credits. FiT rates might be reduced to reflect the value of RECs to a FiT project owner, but the value of RECs in Hawaii is *de minimus* because such RECs are not currently exchanged in Hawaii and because the Commission's order in the Renewable Portfolio Standard docket established a $20/MWh penalty that establishes an upper bound on the value of RECs to Hawaii's utilities.

J. Should prospective FiT-eligible projects have the right to apply for negotiated PPAs?

Yes. Prospective FiT-eligible projects should have the right to apply to the utility for negotiated PPAs, but such a right would be obsolete under a true FiT, like Intervenors' FiT, that has attractive FiT rates and that lacks size, quantity and expenditure caps other than economically-justifiable intermittent renewable generation and peak load caps contained in Intervenors' FiT.

K. What, if any, cost recovery assurance or other compensation should the utility receive in conjunction with the FiT?

The utility should be assured of cost recovery for its FiT renewable energy purchases (including payments for renewable energy that would have been generated and delivered to the utility but for curtailment), but cost recovery by the utility should not be a condition precedent for FiT payments to renewable generators or for enforceability of FiT contracts by renewable generators.

L. How should FiT costs be allocated between the HECO subsidiaries (and their ratepayers)?

FiT costs should be allocated between the HECO subsidiaries and their ratepayers based on the FiT energy purchases made by such subsidiaries.

M. Should the Commission explicitly reserve a right to at least temporarily halt the FiT program due to reliability or economic conditions that arise?

No. Reservation of a right to halt the FiT due to reliability or economic conditions would eliminate the interconnection certainty (for projects meeting the utility's interconnection requirements) and the price and revenue certainty that make the FiT an effective policy for encouraging rapid development of large-scale renewable generation at low cost to the ratepaying public for maximum benefit to the general public.

N. Should net metering be available for FiT-eligible projects?

Yes. Net energy metering (NEM) should be available for FiT-eligible projects if the project is also eligible for net energy metering. A customer-generator eligible for both FiT and NEM should have a one-time choice between FiT and NEM at the time that the project is placed in service.

O. Should the FiT be a contract or a tariff?

The FiT should be a tariff specifying, among other things, the utility's obligation to enter into a contract providing, among other things, for the utility's purchase of renewable energy at FiT rates and having the form attached as an exhibit to the FiT tariff.

P. Should FiT participants assume an obligation to sell power to the utility at FiT rates for the duration of the FiT term?

No. An obligation to sell renewable energy to the utility at FiT rates for the duration of the FiT term is unnecessary because the loss of revenue from a failure by the FiT participant to deliver renewable energy to the utility is penalty enough to ensure deliveries and sale of such energy to the utility at FiT rates for the duration of the FiT term.

VI. General

A. Does Section 269-27.2(b), HRS, empower the Commission to establish a set of feed-in tariffs that compel the utility to offer to purchase power from nonfossil producers at rates, terms and conditions established by the Commission, even if those rates, terms and conditions differ from those proposed by the utility in this proceeding?

Yes.

B. Does the Commission have authority to mandate that the utility procure a particular quantity of nonfossil electricity, exceeding the statutory RPS requirements? Can the Commission establish deadlines? What statutes grant this authority?

Zero Emissions does not know whether the Commission has authority to mandate that the utility procure a particular quantity of nonfossil electricity, exceeding the statutory RPS requirements. Zero Emissions does not know whether the Commission has authority to establish deadlines for such procurement. Zero Emissions does not know what statutes grant such authority.

C. Is the Energy Agreement legally binding on any one? In what way? Who could sue whom for noncompliance?

Zero Emissions does not believe that the Hawaii Clean Energy Initiative Agreement (the "HCEI Agreement") is legally binding on anyone because it is, on its face, a political accord setting an agenda for proposed regulatory and legislative

proposals. Zero Emissions believes that, if one of the parties or a third-party beneficiary to the HCEI Agreement were to ask a court to enforce the HCEI Agreement, the court would lack jurisdiction to enforce the HCEI Agreement because enforcement of the HCEI Agreement would present a political question. Zero Emissions does not believe that any of the parties to the HCEI Agreement may sue any of the other parties to the HCEI Agreement for noncompliance with the HCEI Agreement.

D. Does the Commission have authority to adopt FiTs in this proceeding without having completed a proceeding on Clean Energy Scenario Planning?

Yes. Zero Emissions is not aware of any statute, regulation or order requiring the Commission to open or complete a Clean Energy Scenario Planning proceeding.

E. Under a FiT regime, will there still be a need for a contract between seller and the utility buyer? What form would these written contracts take? What seller obligations should these contracts cover?

Under a FiT regime, a contract between seller and utility buyer is not necessary, but may be useful for specifying all material aspects of the legal relationship between seller and utility buyer. These written contracts generally would take the form of the Schedule FiT Agreement attached as Appendix I to the HECO Companies' Straw Feed-in Tariff and modified to conform to Intervenors' FiT. These contracts generally should cover the seller obligations contained in the HECO Companies' Schedule FiT Agreement as modified to conform to Intervenors' FiT.

F. Assuming there are contracts associated with FiT sales, what is the Commission's statutory obligation to review these contracts? What are effective procedures to expedite Commission review?

The Commission has a statutory obligation to review contracts associated with FiT sales to ensure that the terms of such contracts, including the FiT rates, are just and

reasonable and in the public interest. The Commission might consider appointing a third party reviewer to expedite Commission review of these contracts.

VII. Cost

A. Does HRS § 269-27.2 impose any limit on total cost?

No. HRS § 269-27.2 does not impose any limit on total cost.

For example:

1. Does the phrase "maximize the reduction in fossil fuels" in Section 269-27.2(b) allow the Commission to establish a quantity goal, determine the rate necessary to satisfy that goal, and impose that rate regardless of how high the rate is and regardless of total cost?

Zero Emissions does not know whether the phrase "maximize the reduction in fossil fuels" in HRS § 269-27.2 allows the Commission to establish a quantity goal and determine the rate necessary to satisfy that goal. Zero Emissions does not believe that this phrase allows the Commission to impose that rate regardless of how high the rate is and regardless of total cost, because the costs of that rate must be just and reasonable in relation to the benefits of that rate.

2. Does the "maximize" phrase mandate that result?

No.

3. If you believe the "maximize" phrase mandates that result, what effect does the discretionary term "may" have on the Commission's obligation?

Zero Emissions does not believe that the "maximize" phrase mandates that result.

4. Can the Commission determine a required quantity for the utility to purchase, and then set the rate at whatever level is necessary to attract that quantity? Would such a rate necessarily satisfy the just and reasonable standard?

Zero Emissions does not know whether the Commission can determine a required quantity for the utility to purchase, but does not believe that the Commission may set the rate at whatever level is necessary to attract that quantity if that rate is not just and reasonable to the ratepaying public. Such a rate would not necessarily satisfy the just and reasonable standard, but would satisfy the just and reasonable standard if the benefit of the quantity purchased was just and reasonable in relation to the purchase cost at that rate.

B. Regardless of any statutory limit on cost, does the Commission have authority to establish a dollar limit on the cost of utility acquisition of nonfossil electricity pursuant to an FIT? What statutes grant this authority?

Zero Emissions does not know whether the Commission has statutory authority to establish a dollar limit on the cost of utility acquisition of nonfossil electricity pursuant to an FiT.

C. Does this authority to establish a dollar limit apply only to acquisition above the quantities required by the RPS statute?

Zero Emissions does not know whether statutory authority to establish a dollar limit on the cost of utility acquisition of nonfossil electricity pursuant to an FiT applies only to acquisition above the quantities required by the RPS statute.

VIII. Sellers' Legal Rights

A. PURPA

1. Does a nonfossil developer have an existing statutory right, under state law or PURPA, to a negotiated PPA? If so, does that right continue even if the Commission establishes FiTs that constitute utility offers to buy at a stated rate, or can the Commission make the FiT the exclusive means by which nonfossil producers sell to the utility? Put another way, if there is a FiT applicable to a particular seller, may the Commission authorize (or forbid) the utility to negotiate a PPA on terms that vary from the FiT?

Zero Emissions believes that a nonfossil developer has an existing statutory right under PURPA to a negotiated PPA, but does not have a right under PURPA to a negotiated PPA that would give the nonfossil developer a profit or positive return on its investment in the project. Zero Emissions believes that the existing statutory right under PURPA continues even if the Commission establishes FiTs that constitute utility offers to buy at a stated rate. Zero Emissions does not know whether the Commission can make the FiT the exclusive means by which nonfossil producers sell to the utility. Zero Emissions believes that, if there is a FiT applicable to a particular seller, the Commission may authorize and may not forbid the utility to negotiate a PPA on terms that vary from the FiT, but that the utility's right to negotiate such a PPA does not alter the utility's obligation to purchase renewable energy from an eligible seller under the FiT if the seller does not want to negotiate such a PPA with the utility.

2. Can the Commission substitute a FiT for Schedule Q, as a means of complying with PURPA? What type of issuance from the Commission would be necessary to demonstrate PURPA compliance?

Zero Emissions does not believe that the Commission may substitute a FiT for Schedule Q, as a means of complying with PURPA, because Section 210(m) of PURPA and the accompanying regulations pre-emptively establishes Schedule Q avoided cost rates as a means of complying with PURPA for systems of 100 kW or less. Zero Emissions does not know what type of issuance from the Commission would be necessary to demonstrate PURPA compliance for such a substitution.

B. Does HRS § 269-27.2 create any legal rights in sellers of nonfossil power?

Zero Emissions believes that, if the utility has agreed to purchaser power from a seller of nonfossil power, HRS § 269-27.2 gives the seller a legal right to sell such power at a rate that is not linked to the price of fossil fuel.

For example:

1. **Does the phrase "just and reasonable rate" in HRS § 269-27.2(c) mean "just and reasonable" to the seller, or only "just and reasonable" to the consumer? That is, does the phrase "just and reasonable rate" allow a seller to contest a Commission-established FiT on the grounds that the rate is too low or that non-rate terms and conditions are unfavorable?**

Zero Emissions believes that the phrase "just and reasonable rate" in HRS § 269-27.2(c) means "just and reasonable" to the ratepaying public, not "just and reasonable" to the seller. Zero Emissions does not know whether the phrase "just and reasonable rate" allows a seller to contest a Commission-established FiT on the grounds that the rate is too low or that non-rate terms and conditions are unfavorable.

2. **On what specific grounds could the seller contest the rate? That the rate produces a return on equity too low to attract sellers? How would the seller prove this case, to the Commission and to reviewing courts? What data would the Commission have to rely on to insulate its rate decision from judicial reversal? What evidentiary burden does the seller have, to supply facts to the Commission so that the Commission has the necessary factual support for its decision?**

Zero Emissions does not know on what specific grounds the seller could contest the FiT rate. Zero Emissions does not know whether the seller could contest the FiT rate on the grounds that the FiT rate produces a return on equity too low to attract sellers. Zero Emissions does not know how a seller would prove such a case to the Commission and to reviewing courts. Zero Emissions does not know what data the Commission would have to rely on to insulate its rate decision from judicial reversal. Zero Emissions

does not know what evidentiary burden the seller has, to supply facts to the Commission, so that the Commission has the necessary factual support for its decision.

3. If the Commission declined to establish any FiT rates, but instead authorized the utility to self-produce or purchase renewables as the utility deems appropriate, would the sellers have any legal claim against the utility or the Commission? If the answer is no, then do the sellers have any legal right to contest a Commission-established FiT?

Zero Emissions does not know whether the sellers would have any legal claim against the utility or the Commission if the Commission declined to establish any FiT rates, but instead authorized the utility to self-produce or purchase renewables as the utility deems appropriate. Zero Emissions does not know whether the sellers have any legal right to contest a Commission-established FiT.

C. Assuming the Commission establishes FITs, may the Commission authorize (or forbid) sellers with existing PPAs to terminate the PPA and enter into an agreement under the FIT? Under what conditions? With what Commission involvement?

Zero Emissions does not know whether, under what conditions, or with what involvement, the Commission may authorize or forbid sellers with existing PPAs to terminate their PPAs and enter into agreements under the FiT.

D. Hawaii statutes prohibit undue discrimination in the provision of utility service. How does that prohibition apply in the context of FiTs?

Zero Emissions believes that the statutory prohibition of undue discrimination in the provision of utility service does not apply in the context of FiTs because FiTs apply to the acquisition of renewable energy by the utility, not the provision of utility service to utility customers.

For example:

1. **Can there be different rates for different technologies/sizes/islands: What factual differences are necessary to justify rate differences?**

Yes. There can be different rates for different technologies, different project sizes, or different islands. Factual differences necessary to justify rate differences might include different costs for different technologies, different project sizes, or different islands.

2. **Can there be negotiated PPAs that make use of FiT rates but that vary from each other in other terms and conditions?**

Yes. There can be negotiated PPAs that make use of FiT rates and vary from each other in other terms and conditions, but this possibility does not alter the utility's obligation to enter into the form of Schedule FiT Agreement attached as an exhibit to the FiT and conforming to Intervenors' FiT if the seller does not want to negotiate a PPA with the utility that varies the terms and conditions of such form of Schedule FiT Agreement.

3. **Can there be a negotiated PPA for projects that qualify under the scope of an existing FIT?**

Yes. There can be a negotiated PPA for a project that qualifies under the scope of an existing FiT, but this possibility does not alter the utility's obligation to enter into the form of Schedule FiT Agreement attached as an exhibit to the FiT and conforming to Intervenors' FiT if the seller does not want to negotiate a PPA with the utility for the project that qualifies under thee scope of the existing FiT.

IX. Utility Role

A. Does the Commission have the power to restrict the utility's ability to build its own nonfossil generation, such as requiring the utility to refrain from building whenever there is a viable independent seller offering to sell? What findings must the Commission make to support such a restriction?

Zero Emissions does not know whether the Commission has the power to restrict the utility's ability to build its own nonfossil generation, and does not know what findings the Commission must make to support such a restriction.

B. Same question as above, but applied to a utility affiliate selling renewable energy to another utility affiliate.

Zero Emissions does not know whether the Commission has the power to restrict a utility affiliate's ability to build its own nonfossil generation and sell renewable energy from such generation to another utility affiliate, and does not know what findings the Commission must make to support such a restriction.

* * * *

DATED: Honolulu, Hawaii, June 12, 2009

Erik Kvam
Chief Executive Officer
Zero Emissions Leasing LLC

APPENDIX 1

PROPOSAL FOR FEED-IN TARIFF

SCHEDULE FIT

Feed-in Tariff – Purchases from Renewable Energy Facilities

Definitions:

For the purposes of this Schedule:

(1) "Biogas" means a gaseous fuel produced by anaerobic decomposition of organic matter.

(2) "Biomass" means aquatic or terrestrial plant material, vegetation, or agricultural waste, originating in the State of Hawaii, used as a fuel or energy source.

(3) "Company" means Hawaiian Electric Company, Inc.

(4) "Concentrating Solar Power Facility" means a Renewable Energy Generating Facility that generates electricity by concentrating Solar Radiation to heat a working fluid that drives a generator.

(5) "Electrical Capacity" means the installed maximum potential alternating-current electricity generating capacity, in kilowatts, of a Renewable Energy Generating Facility.

(6) "Energy Storage Facility" means any identifiable facility, plant, installation, project, equipment, apparatus, or the like, located in the State of Hawaii, placed in service after the effective date of this Schedule, and that stores Renewable Energy generated from a Renewable Energy Source, including battery systems, pumped storage, and distributed and virtual storage.

(7) "Energy Source" means a Renewable Energy Source or Stored Energy.

(8) "Hybrid Facility" means a Renewable Energy Generating Facility that generates electricity from two or more Renewable Energy Sources, or a Renewable Energy Facility comprised of a Renewable Energy Generating Facility and an Energy Storage Facility.

(9) "Hydropower" means the energy of moving water, including wave energy, ocean thermal energy conversion, and tidal energy.

(10) "Non-Wood-Burning Generating Facility" means a Renewable Energy Generating Facility that generates electricity from Biomass and that is not a Wood-Burning Generating Facility.

(11) "Offshore Wind Generating Facility" means a Wind Generating Facility that is located in an ocean water depth of at least 20 meters.

(12) "Onshore Wind Generating Facility" means any Wind Generating Facility that is not an Offshore Wind Generating Facility.

(13) "Photovoltaic Generating Facility" means a Renewable Energy Generating Facility that generates electricity from unconcentrated Solar Radiation.

(14) "Renewable Energy" means Renewable Source Energy or Stored Energy.

(15) "Renewable Energy Facility" means a Renewable Energy Generating Facility or an Energy Storage Facility.

(16) "Renewable Energy Generating Facility" means any identifiable facility, plant, installation, project, equipment, apparatus, or the like, located in the State of Hawaii, placed in service after the effective date of this Schedule, and that generates Renewable Energy from a Renewable Energy Source.

(17) "Renewable Energy Generator" means any person that owns, controls, operates, manages, or uses a Renewable Energy Generating Facility to generate Renewable Energy from a Renewable Energy Source.

(18) "Renewable Energy Provider" means a Renewable Energy Generator or a Stored Energy Provider.

(19) "Renewable Energy Source" means the following sources of energy:

(a) Biomass;
(b) Biogas;
(c) Geothermal Energy;
(d) Landfill Gas;
(e) Sewage Treatment Plant Gas;
(f) Hydropower;
(g) Solar Radiation;
(h) Wind.

(20) "Renewable Source Energy" means electricity generated by a Renewable Energy Generating Facility from a Renewable Energy Source.

(21) "Storage Capacity" means the installed maximum potential energy storage capacity, in kilowatt-hours, of an Energy Storage Facility.

(22) "Stored Energy" means energy stored in an Energy Storage Facility.

(23) "Stored Energy Provider" means any person that owns, controls, operates, manages, or uses an Energy Storage Facility to store Renewable Energy generated from a Renewable Energy Source.

(24) "Wood-Burning Generating Facility" means a Renewable Energy Generating Facility that burns wood to generate electricity.

(25) "Wind Generating Facility" means a Renewable Energy Generating Facility that generates electricity from Wind.

Interconnection

At the request of a Renewable Energy Provider that places a Renewable Energy Facility in service, the Company shall interconnect such Renewable Energy Facility to the electric system of the Company, provided that technical requirements set forth in the Company's Rules relating to interconnection of generating or storage facilities with the Company's electric system, as approved by the Public Utilities Commission, are met. Costs incurred to meet technical requirements of interconnection of a Renewable Energy Generating Facility shall be allocated in the manner set forth below under "Interconnection Costs." Each of the Company and the Renewable Energy Provider shall disclose to the other, within 6 weeks of a request by the other, any and all data, relating to the electric system of the Company or the Renewable Energy Facility of the Renewable Energy Provider, necessary to plan and execute such interconnection in conformity with such technical requirements.

A Renewable Energy Facility shall be designed to operate in parallel with the Company's electric system without adversely affecting the operations of its customers and without presenting safety hazards to personnel of the Company or its customers. The Renewable Energy Provider shall furnish, install, operate and maintain facilities such as relays, switches, synchronizing equipment, monitoring equipment and control and protective devices designated by the Company and specified in the standard Schedule FIT Agreement ("Schedule FIT Agreement") as suitable for parallel operation with the electric system of the Company. The Renewable Energy Facility and systems interconnecting the Renewable Energy Facility with the Company's electric system must be in compliance with all applicable safety and performance standards of the National Electric Code (NEC), the Institute of Electrical and Electronics Engineers (IEEE), and the Company's requirements for distributed generation or storage interconnected with the Company's electric system as provided in the Company's Rules, and subject to any other requirements, including payments, as provided in the Schedule FIT Agreement.

Requests to interconnect a Renewable Energy Facility in parallel with the Company's electric system will be processed in accordance with the procedures in Appendix II.

Interconnection Costs

	Tier 1	Tier 2	Tier 3
	Electrical Capacity (kW)		
Oahu	1 - 500 kW	501–1000 kW	> 1000 kW
Maui & Hawaii	1 - 250 kW	251–500 kW	> 500 kW
Lanai & Molokai	1 - 100 kW	101–250 kW	251 – 500 kW
	Interconnection Features and Standards		
Voltage Regulation	None	None	Yes
Frequency Regulation	None	None	Yes
SCADA	None	None	Yes
	Allocation of Interconnection Costs		
Interconnection Review Study (IRS) Costs	Company	Company	Renewable Energy Provider
System and feeder studies and technology verification studies performed by the utility	Company	Company	Company
Project risk assessment costs including costs associated with curtailment studies	Company	Company	50% Company; 50% Renewable Energy Provider
Line extension and transformation	Renewable Energy Provider	Renewable Energy Provider	Renewable Energy Provider

equipment specific to the project			
Substation specific to the project	Company	Company	Company
Equipment installed at the customer site specific to the project	Renewable Energy Provider	Renewable Energy Provider	Renewable Energy Provider
SCADA, control system, and curtailment system specific to the project	Company	Company	Renewable Energy Provider
Utility system costs and upgrades	Company	Company	Company

Schedule FIT Agreement:

The Company shall offer a Schedule FIT Agreement, in the form provided in Appendix I, to any Renewable Energy Provider that requests interconnection of a Renewable Energy Facility to the electric system of the Company under this Schedule. Each such Schedule FIT Agreement shall oblige the Company to purchase and pay for all Renewable Energy generated or stored by the Renewable Energy Facility and delivered to the electric system of the Company, and to purchase and pay for all Renewable Source Energy that would be generated by a Renewable Energy Generating Facility and delivered to the electric system of the Company but for curtailment by the Company of generation or delivery of Renewable Source Energy by the Renewable Energy Generating Facility.

Each such Schedule FIT Agreement shall oblige the Company to purchase and pay for all such Renewable Energy at the feed-in tariff rate of compensation (in cents per kilowatt-hour) set forth in this Schedule. The Company shall compensate the Renewable Energy Provider for such Renewable Energy in an amount no less than the number of kilowatt-hours of such Renewable Energy multiplied by such rate of compensation.

With respect to Renewable Energy generated by a Hybrid Facility and delivered to the electric system of the Company, each such Schedule FIT Agreement shall oblige the Company to take all such Renewable Energy, and shall oblige the Company to purchase and pay for such Renewable Energy at the feed-in tariff rate of compensation (in cents per kilowatt-hour) set forth in this Schedule for each Energy Source from which such Renewable Energy is delivered.

Procedures for requesting and executing a Schedule FIT Agreement are provided in Appendix II to this Schedule.

Metering:

The Company, at its expense, shall install a meter to record the flow of Renewable Energy delivered to the electric system of the Company. The Renewable Energy Provider shall, at its expense, provide, install and maintain all conductors, service switches, fuses, meter sockets, meter instrument transformer housing and mountings, switchboard meter test buses, meter panels and similar devices required for service connection and meter installations on the premises of the Renewable Energy Facility in accordance with the Company's Rules.

Any energy delivered to a Renewable Energy Provider by the Company will be metered separately from any Renewable Energy delivered by the Renewable Energy Provider to the Company, either by use of multiple meters or a meter capable of separately recording the net inflow and outflow of electricity.

Purchase of Renewable Energy Delivered by a Renewable Energy Provider to the Company:

The Company shall pay for each kilowatt-hour ("kWh") of Renewable Energy delivered to the Company by a Renewable Energy Provider as follows.

Renewable Energy Source: Biomass	
Wood-Burning Generating Facility Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 150 kW	17.18
> 150 kW and ≤ 500 kW	13.51
> 500 kW and ≤ 5000 kW	12.18
> 5000 kW	11.45

Renewable Energy Source: Biomass	
Non-Wood-Burning Generating Facility Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 150 kW	28.00
> 150 kW and ≤ 500 kW	24.00
> 500 kW and ≤ 5000 kW	22.00
> 5000 kW	21.00

Renewable Energy Source: Biogas	
Renewable Energy Generating Facility Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 150 kW	17.18
> 150 kW and ≤ 500 kW	13.51

> 500 kW and ≤ 5000 kW	12.18
> 5000 kW and ≤ 20000 kW	11.45

Renewable Energy Source: Geothermal Energy	
Renewable Energy Generating Facility Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 10000 kW	23.49
> 10000 kW	15.41

Renewable Energy Source: Landfill Gas or Sewage Treatment Plant Gas	
Renewable Energy Generating Facility Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 500 kW	13.21
> 500 kW and ≤ 5000 kW	9.10

Renewable Energy Source: Hydropower	
Renewable Energy Generating Facility Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 500 kW	18.60
> 500 kW and ≤ 2000 kW	12.70
> 2000 kW and ≤ 5000 kW	11.23
> 5000 kW and ≤ 10000 kW	8.62
> 10000 kW and ≤ 20000 kW	7.93
> 20000 kW and ≤ 50000 kW	5.86
> 50000 kW	4.70

Renewable Energy Source: Solar Radiation	
Photovoltaic Generating Facility Located on Oahu Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 10 kW	47.9
≥ 10 kW and ≤ 100 kW	43.6
≥ 100 kW and ≤ 500 kW	39.6
≥ 500 kW and ≤ 5000 kW	36.3
≥ 5000 kW	33.0

Renewable Energy Source: Solar Radiation	
Photovoltaic Generating Facility Located on Maui Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 10 kW	52.7
≥ 10 kW and ≤ 100 kW	47.9
≥ 100 kW and ≤ 500 kW	43.6
≥ 500 kW and ≤ 5000 kW	39.9
≥ 5000 kW	36.3

Renewable Energy Source: Solar Radiation	
Photovoltaic Generating Facility Located on Molokai Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 10 kW	57.5
≥ 10 kW and ≤ 100 kW	52.3
≥ 100 kW and ≤ 500 kW	47.5
≥ 500 kW and ≤ 5000 kW	43.6

Renewable Energy Source: Solar Radiation	
Photovoltaic Generating Facility Located on Lanai Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 10 kW	57.5
≥ 10 kW and ≤ 100 kW	52.3
≥ 100 kW and ≤ 500 kW	47.5
≥ 500 kW and ≤ 5000 kW	43.6

Renewable Energy Source: Solar Radiation	
Photovoltaic Generating Facility Located on Hawaii Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 10 kW	53.7
≥ 10 kW and ≤ 100 kW	48.8
≥ 100 kW and ≤ 500 kW	44.4
≥ 500 kW and ≤ 5000 kW	40.7
≥ 5000 kW	37.0

Renewable Energy Source: Solar Radiation	
Concentrating Solar Power Facility Located on Oahu Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 500 kW	39.6
> 500 kW and ≤ 5000 kW	36.3
> 5000 kW and ≤ 10000 kW	33.0
> 10000 kW and ≤ 20000 kW	30.0

Renewable Energy Source: Solar Radiation	
Concentrating Solar Power Facility Located on Maui Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 500 kW	43.6
> 500 kW and ≤ 5000 kW	39.9
> 5000 kW and ≤ 10000 kW	36.3
> 10000 kW and ≤ 20000 kW	34.3

Renewable Energy Source: Solar Radiation	
Concentrating Solar Power Facility Located on Molokai Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 500 kW	47.5
> 500 kW and ≤ 5000 kW	43.6

Renewable Energy Source: Solar Radiation	
Concentrating Solar Power Facility Located on Lanai Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 500 kW	47.5
> 500 kW and ≤ 5000 kW	43.6

Renewable Energy Source: Solar Radiation	
Concentrating Solar Power Facility Located on Hawaii Electrical Capacity (kW)	Feed-in Tariff Rate (¢/kWh)
≤ 500 kW	44.4
> 500 kW and ≤ 5000 kW	40.7
> 5000 kW and ≤ 10000 kW	37.0
> 10000 kW and ≤ 20000 kW	35.0

Renewable Energy Source: Wind	
Onshore Wind Generating Facility Years of Agreement Term	Feed-in Tariff Rate (¢/kWh)
Years 1 through 5	13.51
Years 6 through 20	7.37

Renewable Energy Source: Wind	
Offshore Wind Generating Facility Years of Agreement Term	Feed-in Tariff Rate (¢/kWh)
Years 1 through 12	22.02
Years 13 through 20	5.14

Energy Source: Stored Energy	
Energy Storage Facility Electrical Storage Capacity	Feed-in Tariff Rate (¢/kWh)
≤ 1000 kWh	30.00
> 1000 kWh	25.00

The Commission shall periodically adjust the Schedule FIT feed-in tariff rates of compensation in accordance with the procedures provided in Appendix III of this Schedule. The Renewable Energy Provider shall receive the feed-in tariff rate of compensation in effect at the time of execution of the Schedule FIT Agreement for the entire term of the Schedule FIT Agreement.

Term of Schedule FIT Agreement:

The term of the Schedule FIT Agreement will be as follows, commencing on the initial delivery of Renewable Energy under the Schedule FIT Agreement from the Renewable Energy Provider to the Company:

Energy Source	Term of Agreement
Biomass	20 years
Biogas	20 years
Geothermal Energy	20 years
Landfill Gas	20 years
Sewage Treatment Plant Gas	20 years
Hydropower	20 years
Solar Radiation	20 years
Wind	20 years
Stored Energy	20 years

Net Energy Metering

A Renewable Energy Provider that is eligible to enter into a net energy metering agreement with the Company shall have a choice of either (1) entering into a net energy metering agreement with the Company, or (2) entering into a Schedule FIT Agreement with the Company.

Penetration Limits for Intermittent Renewable Energy Sources

The obligations of the Company to interconnect a Renewable Energy Generating Facility to the Company's electric system and to offer an Schedule FIT Agreement to a Renewable Energy Generator to purchase and pay for Renewable Source Energy at a feed-in tariff rate of compensation under this Schedule shall not apply with respect to Renewable Source Energy produced by a Renewable Energy Generating Facility that is (i) a Wind Generating Facility, and that is placed in service after December 31 of the year following the year during which the aggregate Electrical Capacity of Renewable Energy Generating Facilities that are Wind Generating Facilities as to which technical requirements for interconnection have been met equals or exceeds 25 per cent of the peak demand for such electrical system, provided that the Public Utilities Commission may increase, by rule or order, such aggregate Electrical Capacity limit above 25 per cent of such peak demand, or (ii) a Photovoltaic Generating Facility or a Concentrating Solar Generating Facility, and that is placed in service after December 31 of the year following the year during which the aggregate Electrical Capacity of Renewable Energy Generating Facilities that are Photovoltaic Generating Facilities or Concentrating Solar Generating Facilities as to which technical requirements for interconnection have been met equals or exceeds 20 per cent of the peak demand for such electrical system, provided that the Public Utilities Commission may increase, by rule or order, such aggregate Electrical Capacity limit above the above-referenced 25 per cent and 20 per cent peak demands.

Aggregate Limits

The obligations of the Company to interconnect a Renewable Energy Generating Facility to the Company's electric system and to offer an Schedule FIT Agreement to a Renewable Energy Generator to purchase and pay for Renewable Source Energy at a feed-in tariff rate of compensation under this Schedule shall not apply with respect to Renewable Source Energy generated by a Renewable Energy Generating Facility that is placed in service after December 31 of the year following the year during which the aggregate Electrical Capacity of Renewable Energy Generating Facilities as to which technical requirements for interconnection have been met equals or exceeds 100 per cent of the peak demand for such electrical system, provided that the Public Utilities Commission may increase, by rule or order, such aggregate Electrical Capacity limit above 100 per cent of such peak demand.

Queuing Procedures:

Requests for interconnection of Renewable Energy Facilities under this Schedule shall be administered on a first-ready, first-to-interconnect basis, modeled after the queuing procedures adopted by the Midwest Independent Transmission System Operator, Inc. *See* Midwest Independent Transmission System Operator ("Midwest ISO"), Generator Interconnection Process Tariff (August 25, 2008) http://www.midwestmarket.org/publish/Document/ 25f0a7_11c1022c619_-7d600a48324a/Attachment%20X%20GIP.pdf?action=download&_property=Attachment; Midwest ISO, Business Practices Manual: Generator Interconnection (Manual No. 15, TP-BPM-004-r2, January 6, 2009) http://www.midwestmarket.org/publish/Document/45e84c_11cdc615aa1_-7e010a48324a.

Renewable Energy Certificates:

Any certificate, credit, allowance, green tag, or other transferable indicia or environmental attribute, verifying the generation of a particular quantity of energy from a Renewable Energy Source, indicating the generation of a specific quantity of Renewable Source Energy by a Renewable Energy Generating Facility, or indicating a Renewable Energy Generator's ownership of any environmental attribute associated with such generation, is the property of the Renewable Energy Generator and freely assignable by the Renewable Energy Generator.

APPENDIX 2

CLEAN ENERGY SCENARIO PLANNING

Figures for the rates at which additional amounts of renewable generation would be placed in service in Hawaii during the next 5 years under each of the No FIT Option, the HECO/CA FIT Option and the Intervenors' FIT Option were projected as follows:

	No FIT Option	HECO/CA FIT Option	Intervenors' FIT Option
Onshore Wind: Oahu	8 MW/yr[a]	8 MW/yr	30 MW/yr[b]
Onshore Wind: Maui	0 MW/yr[c]	0 MW/yr	5 MW/yr[d]
Onshore Wind: Hawaii	0 MW/yr[e]	0 MW/yr	5 MW/yr[f]
Solar PV: Oahu NEM non-NEM	1 MW/yr[g] 0 MW/yr[h]	.5 MW/yr[i] 3 MW/yr[j]	1 MW/yr[k] 45.5 MW/yr[l]
Solar PV: Maui NEM non-NEM	.5 MW/yr[m] 1.5 MW/yr[n]	.2 MW/yr[o] 2 MW/yr[p]	.5 MW/yr[q] 7.5 MW/yr[r]
Solar PV: Hawaii NEM Non-NEM	.5 MW/yr[s] 0 MW/yr	.3 MW/yr[t] 1.5 MW/yr[u]	.5 MW/yr[v] 7.5 MW/yr[w]
Concentrating Solar	.5 MW/yr[x]	.5 MW/yr	3 MW/yr[y]
Landfill Gas	0 MW/yr	0 MW/yr	1 MW/yr[z]
Biogas	0 MW/yr	0 MW/yr	4 MW/yr[aa]
Biomass	0 MW/yr[bb]	0 MW/yr	6 MW/yr[cc]
Geothermal	0 MW/yr[dd]	0 MW/yr	6 MW/yr[ee]
TOTAL	**12 MW/yr**	**16 MW/yr**	**122.5 MW/yr**

The total costs, total benefits and net benefits of each of the No FIT Option, the HECO/CA FIT Option and Intervenors' Option (the "Options") were projected as follows:

Total costs and total benefit figures for each of the Options were projected out for 5 years, based on most currently available data for Hawaii, except as noted. Costs and benefits were levelized across 5 years with no adjustments for price inflation or deflation.

Rates of additions to renewable generation in Hawaii were projected based on the "clean energy scenario planning" in Section IV.B above. The rates of addition reflect no acceleration or deceleration due to market, technological or policy factors other than the proposed Options.

Rates of renewable energy generated per MW of additional renewable generation were based on Hawaii data[ff], except for the rate relating to concentrating solar power, which was based on United States data.[gg]

Costs of renewable energy generated in $ per kilowatt-hour under the No FIT Option were projected based on Hawaii price data for negotiated PPAs[hh] and the average retail electricity price in Hawaii for NEM.[ii] Costs of renewable energy generated in $ per kilowatt-hour under the HECO/CA FIT Option were projected based on average FIT rates contained in Zero Emissions Proposal for Feed-in Tariff at Appendix 1. Costs of renewable energy generated in $ per kilowatt-hour under the Intervenors' FIT Option were projected based on average FIT rates contained in Zero Emissions Proposal for Feed-in Tariff at Appendix 1 and the average retail electricity price in Hawaii for NEM.

The benefits of fuel savings in $ per kilowatt-hour were based on the utility's avoided energy cost data for May 2009[jj,kk]. The distributed generation benefits of $.0744/kWh for solar PV and CSP is the sum of average estimated values for avoided

generation capacity capital and fixed O&M costs ($.03685/kWh), avoided transmission & distribution costs ($.0157/kWh), avoided generation and transmission & distribution losses ($.0094/kWh), grid support benefits ($.0185/kWh) and fossil fuel price hedge benefits ($.0068/kWh).[ll] The distributed generation benefits of $.015/kWh for wind, $.059/kWh for landfill gas/biogas, $.066/kWh for biomass and $.028/kWh for geothermal were obtained by multiplying the $1550/kW capital cost of new additions to diesel-fired generating capacity in Hawaii[mm] times a capital recovery factor of 12.15%[nn] times the estimated effective load carrying capability (ELCC) for each of wind, biomass (including biogas and landfill gas) and geothermal[oo] divided by the rates of renewable energy generated per kW of additional renewable generation shown in this Appendix.

The energy security benefits in $ per kilowatt-hour were obtained by measuring the mitigation value of each kilowatt-hour of additional renewable energy in terms of the Hawaii gross domestic product (GDP) that otherwise would be lost as a result of a 10% loss of oil imports for electricity generation in Hawaii during the next 5 years.[pp] The energy security benefit measures the value of mitigating the catastrophic risks and costs of Hawaii's dependence on imported oil for electricity generation.

The net benefit (cost) on the typical residential electricity bill was projected by adding the net benefits and costs of the additions to renewable generation under each of the Options during the 5 year period, dividing the total net benefit (or cost) by a projection of the HECO Companies' sales during the 5 year period[qq] to obtain total net benefit (or cost) as a percentage of the HECO Companies' projected sales, and multiplying that percentage times the dollar amount of a typical Hawaii residential monthly bill.

NO FIT OPTION

Year	Cumulative Generation at:	Annual Generation at:	Cost at Comp Bid, Negotiated or NEM Rate of:	Avoided Fuel Cost Benefits at Avoided Cost Rate of:	Distributed Generation Benefits at:	Net Benefit (Cost) in $	Energy Security Benefit at:	Net Benefit (Cost) in $ including Energy Security Benefit
Oahu Wind:	8	3,262,795	($0.084)	$0.097	$0.015		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	8	26,102,356	($2,192,598)	$2,531,929	$391,535	$730,866	$10,342,854	$11,073,720
2	16	52,204,712	($4,385,196)	$5,063,857	$783,071	$1,461,732	$20,685,707	$22,147,439
3	24	78,307,068	($6,577,794)	$7,595,786	$1,174,606	$2,192,598	$31,028,561	$33,221,159
4	32	104,409,425	($8,770,392)	$10,127,714	$1,566,141	$2,923,464	$41,371,415	$44,294,879
5	40	130,511,781	($10,962,990)	$12,659,643	$1,957,677	$3,654,330	$51,714,269	$55,368,599
PV Oahu:	1	2,340,833	($0.213)	$0.097	$0.0744		$0.40	
NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	1	2,340,833	($498,598)	$227,061	$174,158	($97,379)	$927,537	$830,158
2	2	4,681,667	($997,195)	$454,122	$348,316	($194,757)	$1,855,074	$1,660,316
3	3	7,022,500	($1,495,793)	$681,183	$522,474	($292,136)	$2,782,611	$2,490,475
4	4	9,363,333	($1,994,390)	$908,243	$696,632	($389,515)	$3,710,147	$3,320,633
5	5	11,704,167	($2,492,988)	$1,135,304	$870,790	($486,893)	$4,637,684	$4,150,791
PV Maui:	0.5	2,340,833	($0.213)	$0.092	$0.0744		$0.40	
NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	0.5	1,170,417	($249,299)	$107,678	$87,079	($54,541)	$463,768	$409,227
2	1	2,340,833	($498,598)	$215,357	$174,158	($109,083)	$927,537	$818,454
3	1.5	3,511,250	($747,896)	$323,035	$261,237	($163,624)	$1,391,305	$1,227,681
4	2	4,681,667	($997,195)	$430,713	$348,316	($218,166)	$1,855,074	$1,636,908
5	2.5	5,852,083	($1,246,494)	$538,392	$435,395	($272,707)	$2,318,842	$2,046,135
PV Maui:	1.5	2,340,833	($0.270)	$0.092	$0.0744		$0.40	
non-NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	1.5	3,511,250	($948,038)	$323,035	$261,237	($363,766)	$1,391,305	$1,027,540
2	3	7,022,500	($1,896,075)	$646,070	$522,474	($727,531)	$2,782,611	$2,055,080
3	4.5	10,533,750	($2,844,113)	$969,105	$783,711	($1,091,297)	$4,173,916	$3,082,619
4	6	14,045,000	($3,792,150)	$1,292,140	$1,044,948	($1,455,062)	$5,565,221	$4,110,159
5	7.5	17,556,250	($4,740,188)	$1,615,175	$1,306,185	($1,818,828)	$6,956,526	$5,137,699

PV Hawaii:	0.5	2,340,833	($0.213)	$0.124	$0.0744		$0.40	
NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	0.5	1,170,417	($249,299)	$145,132	$87,079	($17,088)	$463,768	$446,680
2	1	2,340,833	($498,598)	$290,263	$174,158	($34,176)	$927,537	$893,361
3	1.5	3,511,250	($747,896)	$435,395	$261,237	($51,264)	$1,391,305	$1,340,041
4	2	4,681,667	($997,195)	$580,527	$348,316	($68,352)	$1,855,074	$1,786,721
5	2.5	5,852,083	($1,246,494)	$725,658	$435,395	($85,440)	$2,318,842	$2,233,402
CSP:	0.5	1,752,000	($0.21)	$0.101	$0.0744		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	0.5	876,000	($183,960)	$88,476	$65,174	($30,310)	$347,108	$316,799
2	1	1,752,000	($367,920)	$176,952	$130,349	($60,619)	$694,216	$633,597
3	1.5	2,628,000	($551,880)	$265,428	$195,523	($90,929)	$1,041,324	$950,396
4	2	3,504,000	($735,840)	$353,904	$260,698	($121,238)	$1,388,432	$1,267,194
5	2.5	4,380,000	($919,800)	$442,380	$325,872	($151,548)	$1,735,541	$1,583,993
	MW	kWh						
Avg annual additions	12	35,171,273						
5 year total	60							

Total Net Benefit (Cost) 1st 5 Years:		$2,516,741	$211,561,852
divided by:			
2007 Annual HECO Companies Sales in $	$2,090,547,000		
times: 5 years	5		
equals: HECO Companies Sales in $ 1st 5 Years:		$10,452,735,000	$10,452,735,000
Net Benefit (Cost) as % of Utility Sales:		0.02%	2.02%
Typical Hawaii Monthly Residential Bill in kWh	600		
times: 2007 Average Hawaii Retail Price per kWh	$0.213		
equals: Typical Hawaii Monthly Residential Bill in $		$127.80	$127.80
Net Benefit (Cost) on Average Residential Monthly Bill:		$0.03	$2.59
Net Benefit (Cost) in $/kWh:		$0.000	$0.004

HECO/CA FIT OPTION

Year	Cumulative Generation at:	Annual Generation at:	Cost at NEM or FIT Rate of:	Avoided Fuel Cost Benefits at Avoided Cost Rate of:	Distributed Generation Benefits at:	Net Benefit (Cost) in $	Energy Security Benefit at:	Net Benefit (Cost) in $ including Energy Security Benefit
Oahu Wind:	8	3,262,795	($0.135)	$0.097	$0.015		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	8	26,102,356	($3,526,428)	$2,531,929	$391,535	($602,964)	$10,342,854	$9,739,889
2	16	52,204,712	($7,052,857)	$5,063,857	$783,071	($1,205,929)	$20,685,707	$19,479,779
3	24	78,307,068	($10,579,285)	$7,595,786	$1,174,606	($1,808,893)	$31,028,561	$29,219,668
4	32	104,409,425	($14,105,713)	$10,127,714	$1,566,141	($2,411,858)	$41,371,415	$38,959,557
5	40	130,511,781	($17,632,142)	$12,659,643	$1,957,677	($3,014,822)	$51,714,269	$48,699,447
PV Oahu:	0.5	2,340,833	($0.213)	$0.097	$0.0744		$0.40	
NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	0.5	1,170,417	($249,299)	$113,530	$87,079	($48,689)	$463,768	$415,079
2	1	2,340,833	($498,598)	$227,061	$174,158	($97,379)	$927,537	$830,158
3	1.5	3,511,250	($747,896)	$340,591	$261,237	($146,068)	$1,391,305	$1,245,237
4	2	4,681,667	($997,195)	$454,122	$348,316	($194,757)	$1,855,074	$1,660,316
5	2.5	5,852,083	($1,246,494)	$567,652	$435,395	($243,447)	$2,318,842	$2,075,395
PV Oahu:	3	2,340,833	($0.363)	$0.097	$0.0744		$0.40	
non-NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	3	7,022,500	($2,549,168)	$681,183	$522,474	($1,345,511)	$2,782,611	$1,437,100
2	6	14,045,000	($5,098,335)	$1,362,365	$1,044,948	($2,691,022)	$5,565,221	$2,874,199
3	9	21,067,500	($7,647,503)	$2,043,548	$1,567,422	($4,036,533)	$8,347,832	$4,311,299
4	12	28,090,000	($10,196,670)	$2,724,730	$2,089,896	($5,382,044)	$11,130,442	$5,748,398
5	15	35,112,500	($12,745,838)	$3,405,913	$2,612,370	($6,727,555)	$13,913,053	$7,185,498
PV Maui:	0.2	2,340,833	($0.213)	$0.092	$0.0744		$0.40	
NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	0.2	468,167	($99,720)	$45,412	$34,832	($19,476)	$185,507	$166,032
2	0.4	936,333	($199,439)	$90,824	$69,663	($38,951)	$371,015	$332,063
3	0.6	1,404,500	($299,159)	$136,237	$104,495	($58,427)	$556,522	$498,095
4	0.8	1,872,667	($398,878)	$181,649	$139,326	($77,903)	$742,029	$664,127
5	1	2,340,833	($498,598)	$227,061	$174,158	($97,379)	$927,537	$830,158

PV Maui:	2	2,340,833	($0.399)	$0.092	$0.0744		$0.40	
non-NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	2	4,681,667	($1,867,985)	$430,713	$348,316	($1,088,956)	$1,855,074	$766,118
2	4	9,363,333	($3,735,970)	$861,427	$696,632	($2,177,911)	$3,710,147	$1,532,236
3	6	14,045,000	($5,603,955)	$1,292,140	$1,044,948	($3,266,867)	$5,565,221	$2,298,354
4	8	18,726,667	($7,471,940)	$1,722,853	$1,393,264	($4,355,823)	$7,420,295	$3,064,472
5	10	23,408,333	($9,339,925)	$2,153,567	$1,741,580	($5,444,778)	$9,275,368	$3,830,590
PV Hawaii:	0.3	2,340,833	($0.213)	$0.124	$0.0744		$0.40	
NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	0.3	702,250	($149,579)	$68,118	$52,247	($29,214)	$278,261	$249,047
2	0.6	1,404,500	($299,159)	$136,237	$104,495	($58,427)	$556,522	$498,095
3	0.9	2,106,750	($448,738)	$204,355	$156,742	($87,641)	$834,783	$747,142
4	1.2	2,809,000	($598,317)	$272,473	$208,990	($116,854)	$1,113,044	$996,190
5	1.5	3,511,250	($747,896)	$340,591	$261,237	($146,068)	$1,391,305	$1,245,237
PV Hawaii:	1.5	2,340,833	($0.407)	$0.124	$0.0744		$0.40	
non-NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	1.5	3,511,250	($1,429,079)	$435,395	$261,237	($732,447)	$1,391,305	$658,859
2	3	7,022,500	($2,858,158)	$870,790	$522,474	($1,464,894)	$2,782,611	$1,317,717
3	4.5	10,533,750	($4,287,236)	$1,306,185	$783,711	($2,197,340)	$4,173,916	$1,976,576
4	6	14,045,000	($5,716,315)	$1,741,580	$1,044,948	($2,929,787)	$5,565,221	$2,635,434
5	7.5	17,556,250	($7,145,394)	$2,176,975	$1,306,185	($3,662,234)	$6,956,526	$3,294,293
CSP:	0.5	1,752,000	($0.401)	$0.101	$0.0744		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	0.5	876,000	($351,276)	$88,476	$65,174	($197,626)	$347,108	$149,483
2	1	1,752,000	($702,552)	$176,952	$130,349	($395,251)	$694,216	$298,965
3	1.5	2,628,000	($1,053,828)	$265,428	$195,523	($592,877)	$1,041,324	$448,448
4	2	3,504,000	($1,405,104)	$353,904	$260,698	($790,502)	$1,388,432	$597,930
5	2.5	4,380,000	($1,756,380)	$442,380	$325,872	($988,128)	$1,735,541	$747,413
	MW	kWh						
Avg annual additions	16	43,364,189						
5 year total	80							

Net Benefit (Cost) 1st 5 Years:		($60,973,232)	$203,724,090
Plus: Added Cost of Capital Due to HECO/CA Caps:		($220,659,069)	($220,659,069)
Total Benefit (Cost) of HECO/CA FIT 1st 5 years:		($281,632,300)	($16,934,979)
divided by:			
2007 Annual HECO Companies Sales in $	$2,090,547,000		
times: 5 years	5		
equals: HECO Companies Sales in $ 1st 5 Years:		$10,452,735,000	$10,452,735,000
Net Benefit (Cost) as % of Utility Sales:		-2.69%	-0.16%
Typical Hawaii Monthly Residential Bill in kWh	600		
times: 2007 Average Hawaii Retail Price per kWh	$0.213		
equals: Typical Hawaii Monthly Residential Bill in $		$127.80	$127.80
Net Benefit (Cost) on Average Residential Monthly Bill:		($3.44)	($0.21)
Net Benefit (Cost) in $/kWh:		($0.006)	($0.000)

INTERVENORS' FIT OPTION

Year	Cumulative Generation at:	Annual Generation at:	Cost at FIT or NEM Rate of:	Avoided Fuel Cost Benefits at Avoided Cost Rate of:	Distributed Generation Benefits at:	Net Benefit (Cost) in $	Energy Security Benefit at:	Net Benefit (Cost) in $ including Energy Security Benefit
Oahu Wind:	30	3,262,795	($0.135)	$0.097	$0.015		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	30	97,883,836	($13,224,106)	$9,494,732	$1,468,258	($2,261,117)	$38,785,702	$36,524,585
2	60	195,767,671	($26,448,212)	$18,989,464	$2,936,515	($4,522,233)	$77,571,403	$73,049,170
3	90	293,651,507	($39,672,319)	$28,484,196	$4,404,773	($6,783,350)	$116,357,105	$109,573,755
4	120	391,535,342	($52,896,425)	$37,978,928	$5,873,030	($9,044,466)	$155,142,806	$146,098,340
5	150	489,419,178	($66,120,531)	$47,473,660	$7,341,288	($11,305,583)	$193,928,508	$182,622,925
Maui Wind:	5	3,262,795	($0.135)	$0.097	$0.015		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	5	16,313,973	($2,204,018)	$1,582,455	$244,710	($376,853)	$6,464,284	$6,087,431
2	10	32,627,945	($4,408,035)	$3,164,911	$489,419	($753,706)	$12,928,567	$12,174,862
3	15	48,941,918	($6,612,053)	$4,747,366	$734,129	($1,130,558)	$19,392,851	$18,262,292
4	20	65,255,890	($8,816,071)	$6,329,821	$978,838	($1,507,411)	$25,857,134	$24,349,723
5	25	81,569,863	($11,020,088)	$7,912,277	$1,223,548	($1,884,264)	$32,321,418	$30,437,154
Hawaii Wind:	5	3,262,795	($0.135)	$0.097	$0.015		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	5	16,313,973	($2,204,018)	$1,582,455	$244,710	($376,853)	$6,464,284	$6,087,431
2	10	32,627,945	($4,408,035)	$3,164,911	$489,419	($753,706)	$12,928,567	$12,174,862
3	15	48,941,918	($6,612,053)	$4,747,366	$734,129	($1,130,558)	$19,392,851	$18,262,292
4	20	65,255,890	($8,816,071)	$6,329,821	$978,838	($1,507,411)	$25,857,134	$24,349,723
5	25	81,569,863	($11,020,088)	$7,912,277	$1,223,548	($1,884,264)	$32,321,418	$30,437,154
PV Oahu:	1	2,340,833	($0.213)	$0.097	$0.0744		$0.40	
NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	1	2,340,833	($498,598)	$227,061	$174,158	($97,379)	$927,537	$830,158
2	2	4,681,667	($997,195)	$454,122	$348,316	($194,757)	$1,855,074	$1,660,316
3	3	7,022,500	($1,495,793)	$681,183	$522,474	($292,136)	$2,782,611	$2,490,475
4	4	9,363,333	($1,994,390)	$908,243	$696,632	($389,515)	$3,710,147	$3,320,633
5	5	11,704,167	($2,492,988)	$1,135,304	$870,790	($486,893)	$4,637,684	$4,150,791

PV Oahu:	45.5	2,340,833	($0.330)	$0.097	$0.0744		$0.40	
non-NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	45.5	106,507,917	($35,147,613)	$10,331,268	$7,924,189	($16,892,156)	$42,202,926	$25,310,770
2	91	213,015,833	($70,295,225)	$20,662,536	$15,848,378	($33,784,311)	$84,405,852	$50,621,541
3	136.5	319,523,750	($105,442,838)	$30,993,804	$23,772,567	($50,676,467)	$126,608,778	$75,932,311
4	182	426,031,667	($140,590,450)	$41,325,072	$31,696,756	($67,568,622)	$168,811,704	$101,243,082
5	227.5	532,539,583	($175,738,063)	$51,656,340	$39,620,945	($84,460,778)	$211,014,630	$126,553,852
PV Maui:	0.5	2,340,833	($0.213)	$0.092	$0.0744		$0.40	
NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	0.5	1,170,417	($249,299)	$107,678	$87,079	($54,541)	$463,768	$409,227
2	1	2,340,833	($498,598)	$215,357	$174,158	($109,083)	$927,537	$818,454
3	1.5	3,511,250	($747,896)	$323,035	$261,237	($163,624)	$1,391,305	$1,227,681
4	2	4,681,667	($997,195)	$430,713	$348,316	($218,166)	$1,855,074	$1,636,908
5	2.5	5,852,083	($1,246,494)	$538,392	$435,395	($272,707)	$2,318,842	$2,046,135
PV Maui:	7.5	2,340,833	($0.363)	$0.092	$0.0744		$0.40	
non-NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	7.5	17,556,250	($6,372,919)	$1,615,175	$1,306,185	($3,451,559)	$6,956,526	$3,504,968
2	15	35,112,500	($12,745,838)	$3,230,350	$2,612,370	($6,903,118)	$13,913,053	$7,009,935
3	22.5	52,668,750	($19,118,756)	$4,845,525	$3,918,555	($10,354,676)	$20,869,579	$10,514,903
4	30	70,225,000	($25,491,675)	$6,460,700	$5,224,740	($13,806,235)	$27,826,105	$14,019,870
5	37.5	87,781,250	($31,864,594)	$8,075,875	$6,530,925	($17,257,794)	$34,782,631	$17,524,838
PV Hawaii:	0.5	2,340,833	($0.213)	$0.124	$0.0744		$0.40	
NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	0.5	1,170,417	($249,299)	$145,132	$87,079	($17,088)	$463,768	$446,680
2	1	2,340,833	($498,598)	$290,263	$174,158	($34,176)	$927,537	$893,361
3	1.5	3,511,250	($747,896)	$435,395	$261,237	($51,264)	$1,391,305	$1,340,041
4	2	4,681,667	($997,195)	$580,527	$348,316	($68,352)	$1,855,074	$1,786,721
5	2.5	5,852,083	($1,246,494)	$725,658	$435,395	($85,440)	$2,318,842	$2,233,402

PV Hawaii:	7.5	2,340,833	($0.370)	$0.124	$0.0744		$0.40	
non-NEM	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	7.5	17,556,250	($6,495,813)	$2,176,975	$1,306,185	($3,012,653)	$6,956,526	$3,943,874
2	15	35,112,500	($12,991,625)	$4,353,950	$2,612,370	($6,025,305)	$13,913,053	$7,887,748
3	22.5	52,668,750	($19,487,438)	$6,530,925	$3,918,555	($9,037,958)	$20,869,579	$11,831,621
4	30	70,225,000	($25,983,250)	$8,707,900	$5,224,740	($12,050,610)	$27,826,105	$15,775,495
5	37.5	87,781,250	($32,479,063)	$10,884,875	$6,530,925	($15,063,263)	$34,782,631	$19,719,369
CSP:	3	1,752,000	($0.401)	$0.101	$0.0744		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	3	5,256,000	($2,107,656)	$530,856	$391,046	($1,185,754)	$2,082,649	$896,895
2	6	10,512,000	($4,215,312)	$1,061,712	$782,093	($2,371,507)	$4,165,297	$1,793,790
3	9	15,768,000	($6,322,968)	$1,592,568	$1,173,139	($3,557,261)	$6,247,946	$2,690,685
4	12	21,024,000	($8,430,624)	$2,123,424	$1,564,186	($4,743,014)	$8,330,595	$3,587,581
5	15	26,280,000	($10,538,280)	$2,654,280	$1,955,232	($5,928,768)	$10,413,244	$4,484,476
Landfill Gas:	1	3,150,000	($0.091)	$0.101	$0.059		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	1	3,150,000	($286,650)	$318,150	$185,850	$217,350	$1,248,163	$1,465,513
2	2	6,300,000	($573,300)	$636,300	$371,700	$434,700	$2,496,326	$2,931,026
3	3	9,450,000	($859,950)	$954,450	$557,550	$652,050	$3,744,488	$4,396,538
4	4	12,600,000	($1,146,600)	$1,272,600	$743,400	$869,400	$4,992,651	$5,862,051
5	5	15,750,000	($1,433,250)	$1,590,750	$929,250	$1,086,750	$6,240,814	$7,327,564
Biogas:	4	3,150,000	($0.122)	$0.101	$0.059		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	4	12,600,000	($1,534,680)	$1,272,600	$743,400	$481,320	$4,992,651	$5,473,971
2	8	25,200,000	($3,069,360)	$2,545,200	$1,486,800	$962,640	$9,985,302	$10,947,942
3	12	37,800,000	($4,604,040)	$3,817,800	$2,230,200	$1,443,960	$14,977,953	$16,421,913
4	16	50,400,000	($6,138,720)	$5,090,400	$2,973,600	$1,925,280	$19,970,604	$21,895,884
5	20	63,000,000	($7,673,400)	$6,363,000	$3,717,000	$2,406,600	$24,963,255	$27,369,855

Biomass:	6	2,795,918	($0.162)	$0.101	$0.066		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	6	16,775,510	($2,717,633)	$1,694,327	$1,107,184	$83,878	$6,647,164	$6,731,042
2	12	33,551,020	($5,435,265)	$3,388,653	$2,214,367	$167,755	$13,294,328	$13,462,084
3	18	50,326,531	($8,152,898)	$5,082,980	$3,321,551	$251,633	$19,941,493	$20,193,125
4	24	67,102,041	($10,870,531)	$6,777,306	$4,428,735	$335,510	$26,588,657	$26,924,167
5	30	83,877,551	($13,588,163)	$8,471,633	$5,535,918	$419,388	$33,235,821	$33,655,209
Geothermal:	6	7,415,677	($0.235)	$0.101	$0.028		$0.40	
	MW/yr	kWh/MW	per kWh	per kWh	per kWh		per kWh	
1	6	44,494,065	($10,451,656)	$4,493,901	$1,245,834	($4,711,921)	$17,630,424	$12,918,502
2	12	88,988,129	($20,903,312)	$8,987,801	$2,491,668	($9,423,843)	$35,260,848	$25,837,005
3	18	133,482,194	($31,354,967)	$13,481,702	$3,737,501	($14,135,764)	$52,891,271	$38,755,507
4	24	177,976,258	($41,806,623)	$17,975,602	$4,983,335	($18,847,686)	$70,521,695	$51,674,010
5	30	222,470,323	($52,258,279)	$22,469,503	$6,229,169	($23,559,607)	$88,152,119	$64,592,512
	MW	kWh						
Avg annual additions	122.5	359,089,439						
5 year total	612.5	1,795,447,194	($1,256,159,321)					

Total Net Benefit (Cost) 1st 5 Years:		($415,889,261)	$1,260,630,283
divided by:			
2007 Annual HECO Companies Sales in $	$2,090,547,000		
times: 5 years	5		
equals: HECO Companies Sales in $ 1st 5 Years:		$10,452,735,000	$10,452,735,000
Net Benefit (Cost) as % of Utility Sales:		-3.98%	12.06%
Typical Hawaii Monthly Residential Bill in kWh	600		
times: 2007 Average Hawaii Retail Price per kWh	$0.213		
equals: Typical Hawaii Monthly Residential Bill in $		$127.80	$127.80
Net Benefit (Cost) on Average Residential Monthly Bill:		($5.08)	$15.41
Net Benefit (Cost) in $/kWh:		($0.008)	$0.026

HAWAII POWER FACTORS

	kWh/year	MW	kWh/year/MW
Wind	238,184,000	73.0	3,262,795
PV Solar	2,809,000	1.2	2,340,833
Concentrating Solar (US avg)	87,600,000	50.0	1,752,000
Landfill Gas/Biogas	189,000,000	60.0	3,150,000
Biomass	137,000,000	49.0	2,795,918
Geothermal	229,886,000	31.0	7,415,677

ENERGY SECURITY BENEFIT

Hawaii Gross Domestic Product (2007)		$61,500,000,000
Cost to Hawaii of 10% decrease in world oil production as percentage of Hawaii Gross Domestic Product		2.5%
Cost to Hawaii of 10% decrease in world oil production		$1,537,500,000
Hawaii oil consumption for electricity production (10.4 million bbl/year) as a percentage of total Hawaii oil consumption (52.9 million bbl/year)		19.7%
Cost to Hawaii of 10% decrease in world oil production allocable to decreased electricity production		$302,887,500
Hawaii annual oil-fired electricity production in kWh (January 2009)	7,644,000,000	
10% decrease in Hawaii oil imports from 10% decrease in world oil production	10%	
Loss of Hawaii electricity production in kWh from 10% decrease in Hawaii oil imports	764,400,000	
Energy security benefit in $/kWh: Cost to Hawaii of 10% decrease in world oil production allocable to decreased electricity production divided by loss of Hawaii electricity production in kWh from 10% decrease in Hawaii oil imports		$0.40

ADDED COST OF CAPITAL DUE TO HECO/CA FIT CAPS

	Cumulative Generation in MW under Intervenors' FiT	Cumulative Generation in MW under HECO/CA FiT	Deferred Generation in MW Due to Caps under HECO/CA FIT	Deferred Generation in MW as Percentage of Cumulative Generation in MW under Intervenor's FIT	Cumulative Generation in kWh under Intervenor's FIT	Deferred Generation in kWh under HECO/CA FIT	FIT Rate Premium to Compensate Investors for Added Regulatory Risk Due to Caps: 20%	Added Cost of Capital Due to Caps under HECO/CA FIT
Oahu Wind	150	40	110	73.3%	1,468,257,534	1,076,722,192	($0.0270)	($29,093,034)
Maui Wind	25	0	25	100.0%	244,709,589	244,709,589	($0.0270)	($6,612,053)
Hawaii Wind	25	0	25	100.0%	244,709,589	244,709,589	($0.0270)	($6,612,053)
Oahu PV non-NEM	227.5	15	212.5	93.4%	1,597,618,750	1,492,281,250	($0.0660)	($98,490,563)
Maui PV non-NEM	37.5	10	27.5	73.3%	263,343,750	193,118,750	($0.0726)	($14,020,421)
Hawaii PV non-NEM	37.5	7.5	30	80.0%	263,343,750	210,675,000	($0.0740)	($15,589,950)
CSP	15	2.5	12.5	83.3%	78,840,000	65,700,000	($0.0802)	($5,269,140)
Landfill Gas	5	0	5	100.0%	47,250,000	47,250,000	($0.0182)	($859,950)
Biogas	20	0	20	100.0%	189,000,000	189,000,000	($0.0244)	($4,604,040)
Biomass	30	0	30	100.0%	251,632,653	251,632,653	($0.0324)	($8,152,898)
Geothermal	30	0	30	100.0%	667,410,968	667,410,968	($0.0470)	($31,354,967)
							TOTAL:	($220,659,069)

[a] Projected addition of 30 MW Kahuku Wind project plus 50 MW wind per HECO RFP (50% actually placed in service times 100 MW RFP) divided by 10 year gestation period = 8 MW/year.
[b] Projected additions equal to *ca.* 1200 MW Oahu peak load (*see* US Energy Information Administration Form EIA-861 ("EIA-861")) times Intervenors' FIT 25% grid penetration limit for wind divided by 10 year gestation period = 30 MW/year.
[c] No projected additions from proposed Molokai/Lanai, Shell Wind and Kaheawa Wind Power II projects.
[d] Projected additions equal to *ca.* 200 MW Maui peak load (per EIA-861) times Intervenors' FIT 25% grid penetration limit for wind divided by 10 year gestation period = 5 MW/year.
[e] No projected additions from proposed Na Makani Wind project.
[f] Projected additions equal to *ca.* 200 MW Hawaii peak load (per EIA-861) times Intervenors' FIT 25% grid penetration limit for wind divided by 10 year gestation period = 5 MW/year.
[g] Projected additions equal to 50% excess energy delivered to HECO from *ca.* 2.4 MW of NEM PV systems placed in service on Oahu during 2008 per HECO Companies' Net Energy Metering Status Report filed January 9, 2009) (the "NEM Report") = *ca.* 1 MW/year.
[h] No projected additions from proposed PV system to be placed in service on Ward Avenue.
[i] Projected additions equal to 50% excess energy delivered to HECO from *ca.* 2.4 MW/year of NEM PV systems on Oahu for 2 years per Final Statement of Position of the HECO Companies and Consumer Advocate (filed March 30, 2009), same as No FIT Option, followed by no projected additions to NEM PV systems on Oahu for 3 years due to HECO/CA FIT's proposed elimination of NEM = *ca.* .5 MW/year average of NEM PV systems on Oahu during next 5 years.
[j] Projected additions equal to *ca.* 45% of aggregate 6.5 MW/yr of FIT PV systems to be placed in service annually under HECO/CA FIT = *ca.* 3 MW/year; no projected additions from proposed PV Host Pilot Program.
[k] Projected additions equal to 50% excess energy delivered to HECO from *ca.* 2.4 MW of NEM PV systems placed in service on Oahu during 2008 per the NEM Report = *ca.* 1 MW/year.
[l] Projected additions equal to *ca.* 1200 MW Oahu peak load (per EIA-861) times Intervenors' FIT 20% grid penetration limit for solar times 95% of solar FIT grid penetration limit allocable to PV solar (reflecting ratio of *ca.* 10 MW PV solar to .5 MW CSP projected to be placed in service during 2009) divided by 5 year gestation period = *ca.* 45.5 MW/year; no projected additions from proposed PV Host Pilot Program.
[m] Projected additions equal to 50% excess energy delivered to MECO from *ca.* .8 MW of NEM PV systems placed in service on Maui during 2008 per the NEM Report = *ca.* .5 MW/year.
[n] Projected additions equal to 1.5 MW PV system placed in service on Lanai during 2008.
[o] Projected additions of 50% excess energy delivered to MECO from *ca.* .8 MW/year of NEM PV systems on Maui for 2 years per Final Statement of Position of the HECO Companies and Consumer Advocate (filed March 30, 2009), same as No FIT Option, followed by no projected additions to NEM PV systems on Maui for 3 years due to HECO/CA FIT's proposed elimination of NEM = *ca.* .2 MW/year average of NEM PV systems on Maui during next 5 years.
[p] Projected additions equal to *ca.* 30% of aggregate 6.5 MW/yr of FIT PV systems to be placed in service annually under HECO/CA FIT = *ca.* 2 MW/year; no projected additions from proposed PV Host Pilot Program.
[q] Projected additions equal to 50% excess energy delivered to MECO from *ca.* .8 MW of NEM PV systems placed in service on Maui during 2008 per the NEM Report = *ca.* .5 MW/year.
[r] Projected additions equal to *ca.* 200 MW Maui peak load (per EIA-861) times Intervenors' FIT 20% grid penetration limit for solar times 95% of solar FIT grid penetration limit allocable to PV solar divided by 5 year gestation period = *ca.* 7.5 MW/year; no projected additions from proposed PV Host Pilot Program.
[s] Projected additions equal to 50% excess energy delivered to HELCO from *ca.* 1.0 MW of NEM PV systems placed in service on Hawaii during 2008 per the NEM Report = *ca.* .5 MW/year.
[t] Projected additions equal to 50% excess energy delivered to HELCO from *ca.* 1.0 MW/year of NEM PV systems on Hawaii for 2 years per Final Statement of Position of the HECO Companies and Consumer Advocate (filed March 30, 2009), same as No FIT Option, followed by no projected additions to NEM PV systems on Hawaii for 3 years due to HECO/CA FIT's proposed elimination of NEM = *ca.* .3 MW/year average of NEM PV systems on Hawaii during next 5 years.

[u] Projected additions equal to *ca.* 25% of aggregate 6.5 MW/yr of FIT PV systems to be placed in service annually under HECO/CA FIT = *ca.* 1.5 MW/year; no projected additions from proposed PV Host Pilot Program.
[v] Projected additions equal to 50% excess energy delivered to HELCO from *ca.* 1.0 MW of NEM PV systems placed in service on Hawaii during 2008 per the NEM Report = *ca.* .5 MW/year.
[w] Projected additions equal to *ca.* 200 MW Hawaii peak load (per EIA-861) times Intervenors' FIT 20% grid penetration limit for solar times 95% of solar FIT grid penetration limit allocable to PV solar divided by 5 year gestation period = *ca.* 7.5 MW/year; no projected additions from proposed PV Host Pilot Program.
[x] Projected addition of one 500 kW CSP system per year like Keahole Solar Power's CSP system to be placed in service at NELHA during 2009.
[y] Projected additions equal to aggregate *ca.* 1600 MW peak load times Intervenors' FIT 20% grid penetration limit for solar times 5% of solar FIT grid penetration limit allocable to CSP divided by 5 year gestation period = *ca.* 3 MW/year.
[z] Projected addition of 5 MW Waimanolo Gulch landfill gas project divided by gestation period of 5 years = 1 MW/year.
[aa] Projected addition of 20 MW anaerobic digester system at Maui sugar mill divided by gestation period of 5 years = 4 MW/year.
[bb] No projected additions from proposed Pulehu and Hamakua biomass projects.
[cc] Projected additions of 6 MW Pulehu Power and 25 MW Hamakua biomass projects divided by gestation period of 5 years = *ca.* 6 MW/year.
[dd] No projected additions from Puna Geothermal.
[ee] Projected addition of 30 MW to Puna Geothermal generating capacity divided by 5 year gestation period = 6 MW/year.
[ff] US Energy Information Administration Form EIA-906 "Power Plant Report: Net Generation by State, Type of Producer and Energy Source" (2007); US Energy Information Administration Form EIA-860 "Annual Electric Generator Report" (2007); US Energy Information Administration "Hawaii Renewable Electricity Profile" (2006); Application filed August 22, 2008 in Docket No. 2008-0167 (PPA with Lanai Sustainability Research, LLC) (1.2 MW PV solar plant in Hawaii producing 2,809,000 kWh/year).
[gg] *Wikipedia* "Solar thermal energy," accessed at http://en.wikipedia.org/wiki/Solar_thermal_energy on May 20, 2009 (50 MW solar thermal power plant typically produces 87,600 MWh/year).
[hh] Decision and Order filed March 18, 2005 in Docket No. 04-0365 (fixed rate portion of PPC with Kaheawa Wind Power, LLC); Decision and Order filed October 31, 2008 in Docket No. 2008-0167 (PPA with Lanai Sustainability research, LLC); Decision and Order filed November 28, 2008 in Docket No. 2008-0186 (PPA with Keahole Solar Power LLC).
[ii] US Form EIA-861 "Annual Electric Power Industry Report" (2007).
[jj] May 2009 Avoided Energy Cost Data filed by the HECO Companies on April 30, 2009.
[kk] The use of avoided cost understates the fuel savings benefits of the FIT because such use assumes that the utility, which is obliged to purchase renewable energy under the FiT, will curtail first its own imported fuel generation that has a fuel cost equal to the avoided cost, which is an average of all the utility's fuel costs. In fact, the utility will first curtail its own imported fuel generation that has the *highest* fuel cost, i.e., diesel fuel peaking generation. The utility's substitution of its highest cost imported-fuel generation with renewable generation (that the utility must purchase under the FIT) is called "merit order", and the fuel cost savings from such substitution is called "merit order savings." In Germany, the federal government estimates that the merit order savings *by themselves* exceed the additional costs to German ratepayers of the utility's renewable energy purchases under the German FIT. Federal Republic of Germany Ministry for the Environment, Nature Conservation and Nuclear Safety, *EEG – The Renewable Energy Sources Act* (July 2007), accessed on May 30, 2009 at http://www.gtai.com/uploads/media/EEG_Brochure_01.pdf .
[ll] Americans for Solar Power (ASPv), *Build-up of PV Value in California* (April 13, 2005) (methodology accessed on May 30, 2009 at http://www.suncentricinc.com/downloads/aspv2005.pdf). *See* G. Harris, *Net Metering or Feed-in Tariff? Can they co-exist?* (September 2008), showing ASPv study results at http://www.suncentricinc.com/downloads/SunCentric_Business-Perspectives_Net_Metering_or_FiT.pdf The average estimated values from the ASPv study fall within the mid-range of values from similar studies reviewed for the National Renewable Energy Laboratory (NREL). J.L. Contreras, L. Frantzis, S.

Blazewicz, D. Pinault and H. Sawyer, *Photovoltaic Value Analysis,* NREL Subcontract Report NREL/SR-581-42303 (February 2008), accessed May 30, 2009 at http://www1.eere.energy.gov/solar/pdfs/42303.pdf .

[mm] The $1550/kW capital cost of new additions to diesel-fired generating capacity in Hawaii was obtained by taking the current total cost estimate of $193 million for the Campbell Industrial Park Generating Station and Transmission Additions (*see* "Update to Cost Estimate" filed by HECO on May 6, 2009 in Docket No. 05-0145), allocating about 86% of that total cost estimate to the Generation Station Additions (based on the initial cost estimate of $115,399,255 for the Generation Station Additions as a percentage of the initial cost estimate of $134,310,260 for both the Generation Station Additions and the Transmission Additions contained in the Application filed by HECO on June 17, 2005 in Docket No. 05-0145) and dividing by the estimated 107,000 kW generating capacity of the Station.

[nn] Capital recovery factor of 12.15% over 20 year period based on return on average common equity of 10.5% agreed to by parties in HECO's 2009 test year rate case proceeding. *See* Form 8-K for Hawaiian Electric Industries Inc. Item 1.01 Entry into a Material Definitive Agreement dated May 21, 2009, accessed on June 11, 2009 at http://biz.yahoo.com/e/090521/he8-k.html .

[oo] *See* M. Milligan, B. Kirby, K. Jackson and H. Shiu, "California Renewables Portfolio Standard Renewable Generation Integration Cost Study: Multi-Year Analysis (April 3, 2006), accessed on May 30, 2009 at http://www.energy.ca.gov/portfolio/documents/2006-04-03_workshop/2006-04-03_RPS_INTEGRATION_COST.PDF (average ELCC for wind = 25%; ELCC for biomass = 98%; ELCC for geothermal w/o steam constraint = 109%).

[pp] US Energy Administration "State Energy Profile: Hawaii" accessed May 21, 2009 at http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=HI# ; Testimony of Ted Liu, Director of Department of Business Economic Development and Tourism, before the House Committee on Energy and Environmental Protection re HB2308 (February 7, 2006).

[qq] US Energy Administration Form EIA-861 "Annual Electric Power Industry Report" (2007).

CERTIFICATE OF SERVICE

I hereby certify that I have this date filed and served the original and eight copies of the foregoing **OPENING BRIEF AND PROPOSAL FOR FEED-IN TARIFF OF ZERO EMISSIONS LEASING LLC** in Docket No. 2008-0273, by hand delivery to the Commission at the following address:

CARLITO CALIBOSO
PUBLIC UTILITIES COMMISSION
465 S. King Street, Suite 103
Honolulu, HI 96813

I hereby further certify that I have this date served two copies upon the following party of the foregoing **OPENING BRIEF AND PROPOSAL FOR FEED-IN TARIFF OF ZERO EMISSIONS LEASING LLC** in Docket No. 2008-0273, by causing such copies or copy thereof to be mailed, postage prepaid, and properly addressed to each such party as follows:

CATHERINE P. AWAKUNI
DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS
DIVISION OF CONSUMER ADVOCACY
P.O. Box 541
Honolulu, HI 96809

I hereby further certify that I have this date served one copy upon each of the following parties, of the foregoing **OPENING BRIEF AND PROPOSAL FOR FEED-IN TARIFF OF ZERO EMISSIONS LEASING LLC** in Docket No. 2008-0273, by causing each such copy thereof to be sent via e-mail in a portable document format ("pdf") to each such party as follows:

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